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[OFFICIAL NOTICE.]

Where to Find the Western Gas Association's Exhibit, and the Custodian Thereof, at the World's Fair.

To the Fraternity: The exhibit of the Western Gas Association, at the World's Fair, St. Louis, is located in Section 33A, Liberal Arts Building, where Mr. Fred. R Persons, who is in charge of the same, will always be on hand to receive visitors and to explain anything that requires explaining.

[NOTICE.]

Twelfth Annual Meeting, Michigan Gas Association.

JACKSON GAS COMPANY,
JACKSON, MICH., July 20, 1904.

To the Members of the Michigan Gas Association: Preparations for the meeting of the Michigan Gas Association, to be held in Jackson, September 21st and 22d, 1904, are now well underway. The following papers are promised definitely:

"Retort House Practice in a Small Works," by Mr. George C. Turner, Secretary Coldwater (Mich.) Gas Light and Fuel Company.

"Temperatures as Applied to the Production and Purification of Coal Gas," by Mr. V. F. Dewey, Asst. Supt., Detroit City Gas Company.

"Commercial Lighting," by Mr. R. Schacklette, Manager Adrian (Mich.) Gas Company.

Also, a most interesting report on "Naphthaline," by Messrs. White and Ball.

In this connection let me call your attention to the "Question Box," with its special feature known as the "Trouble Box," which is in charge of Mr. E. F. Lloyd. Every member can help make this special feature a success by sending to Mr. Lloyd good, live questions or by relating their experience, or by asking help on the troubles they have had during the past year. If you have no questions to ask, no new experiences during the past year, and have encountered no troubles, this "Question Box" cannot help you. If the contrary is true, write to Mr. Lloyd, and *do it now*. Remember, all these things will be referred to some member for investigation, all of which takes time, and you should be as prompt as possible in communicating with Mr. Lloyd.

Don't forget to bring an application for membership from some fellow not now in the fold, and *be sure to attend the meeting yourself*.

Wishing that I will have the pleasure of welcoming you in Jackson,

Yours very truly, S. E. WOLFF, President.

[OFFICIAL NOTICE.]

Wrinkle Department, Western Gas Association.

OFFICE OF EDITOR WRINKLE DEPARTMENT,
ST. LOUIS, MO., July 25, 1904.

To the Members of the Western Gas Association: We again invite contributions to the Wrinkle Department of the Western Gas Association for the meeting of 1905. The Editor wishes to call the attention of the members of the Western Gas Association, and of the gas fraternity at large, to the fact that the "Western" has done good work in this department in the past; that its Wrinkles have been of value to many, and that it proposes to continue the good work.

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SMITHSONIAN DEPOSIT

The Editor further wishes to suggest that an earnest effort be made to improve the quality of the Wrinkles submitted, as a great many of the devices, while of undoubted practical value, are such as any gas works' foreman should know. We desire the Wrinkles which have a greater bearing on the scientific and technical portion of our business. Of course, there will always be room for the little, handy, practical devices, which so often help us over the rough places. We will gladly receive them, but we should all aim to place the gas business on a par with other scientific and engineering enterprises which are practically in a basis of exact knowledge and high efficiency.

To that end, therefore, we desire to secure a large collection of Wrinkles for the 1905 meeting. Give us the benefit of the mathematical, chemical, thermal and other devices which have helped you in designing or improving your plants; do not hesitate to send in the practical devices which are not on record so far; submit the ideas which have made the business end a success; and, finally, let every individual contribute his portion, so that the result may be worthy the achievements of the past, and a credit to the Western Gas Association.

The following wrinkle is submitted as a sample to guide others somewhat in working out their contributions to this department. This describes a method of regulating the pressure on the outlet of a holder in proportion to the rate of sendout, and was contributed by the writer to another Association some time ago.

"The essential idea of street pressure regulation is to maintain a certain pressure at the consumers' meters within a small percentage either way of the fixed pressure. As the consumption increases or decreases, the holder pressure should be raised or lowered. This is usually done by having recording pressure gauges located in the district supplied by the holder, and raising or lowering the holder pressure until the best average for the district is reached.

"Now, it is, of course, true that the same conditions of consumption never obtain on successive days or months, and, therefore, the following automatic indicator was suggested by the writer: In the outlet pipe of the holder we place a Pitot tube facing the holder. Naturally, the opening from the Pitot tube which faces the stream of flowing gas gives the pressure due to the sum of the static head plus the impact or velocity head, whereas the side openings give the pressure due to the static head only. Therefore, any variation in the rate of flow of the gas is at once indicated by the variation in differential pressure from the two openings of the Pitot tube.

"By using a very sensitive differential pressure gauge, we can thus observe this variable rate of flow. It is, of course, necessary to calibrate the instrument for each holder to be able to tell what pressures to carry on the outlet pipe for each division on the sensitive differential gauge, and it would probably be well to check this three or four times during the year. The Laclede Gas Light Company has so far secured three satisfactory types of extremely sensitive differential pressure gauges, and we have arranged them with two scales, one of which shows the divisions in millimeters and the other gives the proper pressures to be carried on the holder outlet opposite the indicator on the gauge. The writer purposely refrains from adding drawings or too much detail to the above description, as he merely wishes to submit one idea, which he hopes will suggest many others to help swell the contributions."

We must start the work at once; therefore, please send your ideas to the Editor, 716 Locust street, St. Louis, Mo., and oblige, Yours truly,

W. A. Baehr, Editor Wrinkle Department.

BRIEFLY TOLD.

An Important Tax Decision, New York City.—Last week Mr. Justice McCall, sitting in Special Term, Part III., Supreme Court, State of New York, handed down a decision, in the matter of the report made by the referee respecting an appeal of the Edison Electric Illuminating Company, of this city, who protested against the assessment fixed by the authorities on its personal property as the taxable basis for the year 1900, up to and including the second Monday of January, 1901. A summing of the opinion is herewith appended:

"As to conclusion reached by the learned referee," said the Court, "upon the question of the assessment on the personalty of the relator, reducing the sum of $364,580, both sides seemingly acquiesce, the relator (the Edison Company) in asking for the confirmation of so much of the referee's report as refers to that feature, and the respondents (Tax Commissioners) by asserting in their brief they will not urge that any error has been committed by the referee in this regard. So, therefore, the Court accepts that portion of it, and makes its determination.

"I regret to say," the Justice continued, "that I am wholly at opposites and cannot agree with the learned referee on the question of the $80,000 assessment levied on the conduits, cables, etc., of the relator as real estate.

"He has practically found that in January, 1901, in some 12,000 cases throughout our city, on private properties not owned by this relator, but belonging to different individuals to whom the Company was furnishing electricity, that it (the Company) had switches, wires and meters. * * * He determines that these switches, wires and meters are real estate, subject to assessment as such, and although he finds the value of the same to be but about $24,000, yet, because no objection had originally been taken to the action of the Commissioners in fixing the amount at $80,000, he, the referee, is prohibited from entering upon the question of the quantum of assessment, and hence the original amount must stand, I cannot find myself in consonance with either of these views.

"In my judgment, under the facts revealed by this record; the declaring of these mere incidents to the conduct of this relator's business to be real estate situated as the learned referee reports them to have been, not upon property owned by it, but on lands of the individuals to whom it was supplying electricity, was a pure fiction, without support of any law that I have been able to find or apply."

Notes——

The Gulf Refining Company has purchased the tract known as the "Healy property," Gretna, La., which place is on the opposite side of the river from New Orleans. The Company expects to largely increase its tankage facilities at Gretna, and incidentally to make practical use of such tankage construction for the cheaper supply of oil to New Orleans. To effect such purpose the Gulf people have petitioned the United States for permission to lay a pipe line under the river.

Messrs. Samuel W. McCall and James A. Bailey, as Receivers for the Framingham (Mass.) Gas, Fuel and Power Company, having filed their accounts with the Superior Court, together with a petition for permission to dispose of the Company's belongings at public auction, the Court has ordered that all parties interested in the matter shall appear before it, in Equity Division, Boston, 10 A.M., of Wednesday next, to argue why or not such petition of the Receivers shall be affirmed.

Mr. L. L. Merrifield, of the Economical Gas Apparatus Construction Company, of Toronto, Can., writing under date of the 2d inst., says: "We have just completed a scrubbing and condensing plant for the Berlin (Ont.) Light Commissioners. The apparatus comprises a scrubber-condenser, a P. & A. tar extractor. a tar and ammonia separator, meter, etc. This plant has been put into commission. We have also closed a contract with the Light Commissioners of Owen Sound, Ont., for a coal gas plant comprising 2 benches of half-depth 6's, exhauster, condenser, P. & A. tar extractor, washer-scrubber, scrubber, tar and ammonia separator, seal pots, purifiers, pumps, connections, etc. This plant we expect to have in operation September next. We are also remodeling the gas plant at Napanee, Ont., where we are installing 2 benches of 3's, an exhauster, purifiers, etc. This plant will be completed by Aug. 15th. We are also under contract with the Winnipeg (Manitoba) Electric Street Railway Co. to construct a coal gas plant, the agreement calling for the following: A gasholder of 500,000 cubic feet capacity, to rest in steel tank; 5 benches of full-depth, through 6's, 4 purifying boxes, 25 feet by 25 feet, by 4 feet deep; a station meter; two 18-inch station governors; two exhausters; three multitubular condensers; tar separator; washer scrubber; coal and oxide handling machinery; three horizontal tubular boilers, and all necessary connections. This plant we expect to complete by December 1st."

Manager E. H. Williams, of the Waterbury (Conn.) Company has been empowered to make the announcement that, beginning the 1st inst., the net rate for gas used on fuel account will rule at $1.15 per 1,000, the rate on illuminating account to be $1.25 per 1,000.

A pleasant incident respecting the leave taking of Mr. Frank Hellen (who resigned the position of Superintendent of Distribution to the Detroit City Gas Company to accept a similar position with the Rochester (N. Y.) Company) with his former associates and employees was the presentation to him by them of a valuable diamond ring.

At the annual meeting of the New Bedford (Mass.) Gas and Edison Light Company the officers chosen were: Directors, H. G. Howland, Thos. H. Knowles, Chas. R. Price, George E. Stetson, Chas. H. Lamson, F. Taber, Oliver Prescott, Jr., John S. Perry, H. M. Knowles, L. B. Bates and P. M. Lund; Treasurer and Clerk, Chas. R. Price.

Mr. H. L. Rice, formerly of Norfolk, Va., has been appointed Assistant Manager of the Fox River Heat, Light and Power Company, with headquarters at Aurora, Ills.

The plant of the Beaumont (Tex.) Gas Company is being enlarged to the point where its distributing capacity will have reached the unit of 300,000 cubic feet per day.

[Report, as Furnished by the Secretary—Continued from Page 168.]

PROCEEDINGS OF THE CONGRESS OF GAS ASSOCIATIONS OF AMERICA.

HELD IN LIBRARY HALL, HALL OF CONGRESS, LOUISIANA PURCHASE EXHIBITION, ST. LOUIS, MO., WEDNESDAY AND THURSDAY, JUNE 15 AND 16.

THURSDAY'S SESSION, JUNE 16.

Mr. Norris, called the meeting to order at 10:40 A.M., and said: We will start the proceedings this morning with a discussion on the ventilation of retort houses, which is one of the extra topics that we wish to work in here, and it will be started by Mr. Alfred Lotz, of Chicago, one of our new members.

INTRODUCING PRESIDENT ALDRICH.

Before calling on Mr. Lotz to start this discussion, I wish to turn the meeting over to the President of another of the Associations taking part in this Congress. We have had the President of the American, of the Western and of the Ohio Associations presiding at the Congress, and we now propose to have the meeting presided over by the President of another District Association, and I present to you Mr. W. A. Aldrich, the President of the Pacific Coast Gas Association. (Applause.)

Mr. Aldrich—Mr. Chairman and Gentlemen of the Congress of Gas Associations of America: Before proceeding to the business of this morning's session, I desire, in behalf of the Pacific Coast Gas Association, to extend to the gentlemen present our most hearty greetings for your future welfare and the success of this Congress. This is not a time for speechmaking, so without any further preface, I will call upon Mr. Alfred Lotz, of Chicago, to open the discussion on the subject of

THE VENTILATION OF GAS RETORT HOUSES.

[For the text of the initial remarks made by Mr. Lotz, see his paper on the named subject, JOURNAL for July 18, 1904, p. 86. This paper was declared taken as read by the Western Gas Association at its session just prior to the meeting of the Gas Congress, and ordered printed in its records.]

Discussion.

The President (Mr. Aldrich)—This is a very interesting topic, and no doubt there are others present who can discuss the subject. If so, we shall be pleased to hear from them. I will call on Mr. E. H. Earnshaw, of Philadelphia, to address us on this topic.

Mr. Earnshaw—In Philadelphia we have tried a number of methods for ventilating our retort houses, having been much troubled with the steam and gases in the lower floor, but nothing that we have tried has been successful, so that I think this paper is much in line with what we want to know. We have tried ventilating fans with preheated air, a system installed by the Sturtevant Company, theoretically expected to do the work, but it made very little impression on the situation. The air ducts leading to the fan were made of galvanized iron and lasted but a very short time under the influence of the steam and sulphur vapors from the coke. In the course of a year they all fell down of themselves. We then tried a system of pipes leading from the lower floor along the front of the benches and extending above the hydraulic main, one pipe between each two benches, expecting that the heat of the benches would give us a natural draft in these standpipes and help to clear away the steam from the lower floor. A great deal of steam seemed to come up through the pipes, but we did not miss it downstairs, and that seems to be the trouble. The quantity of steam, where you are drawing coke fast with drawing machines, is so enormous that nothing that we have tried has been able to care for the quantity of of steam. In the house that I am speaking of we have 36 benches of 9's, 18 on a side, and we draw them pretty fast. We draw 42 retorts in about 20 minutes, which makes a great deal of steam to be taken care of.

The President (Mr. Aldrich)—We would like to hear from Mr. R. M. Searle, of Mount Vernon, N. Y.

Mr. Searle—The scheme of ventilating, as presented by Mr. Lotz, would seem to me to produce an ideal condition for an explosion sooner or later. With this large duct in handling gases and steam, the steam in contact with red hot coke, it looks to me as if sooner or later some accident would happen to the blowing plant, and that there would be a terrific blast pipe accident or explosion. Another feature that would have to be taken care of, from the standpoint of expense, is the material used in its construction. It seems to me that an expensive construction would be cheaper in the long run, such as glazed tiles and channels. I have been up against the problem of ventilating retort houses in which there were 10 benches of 9's, and the simplest method which suggested itself, and one which became automatic, was a stack 16 feet square, about 50 feet high. As the temperature of the basement rises the stack draws faster. We calculated that the stack emptied the basement every 20 seconds, or 3 times a minute. We found we had to close the side windows of the basement and take all the air at the extreme end of the building, through the basement, to this stack at the other extreme end. A newspaper held in suspension at the open end of the cellar would float the entire length of the cellar in the draft and ascend the stack, and as the temperature rose the travel of the paper was much more rapid. This absolutely cleared the basement and gave as good satisfaction as we could ask for. The construction of that stack would cost $800 if it were built simply as a stack. We fortunately were able to use some walls which were already standing. One wall of the stack is the end of the retort house, another wall is the retaining wall of an embankment, another wall is the end of the office building, and the remaining wall is the end of the wash and sanitary room. These four walls, which were already standing, run up 45 feet of the total height of the stack. I do not think the average coal gas men appreciate the importance of the economy of retort house ventilation. If not ventilated you get a beautiful labor economy for a few hours in the early part of the day, and then as the men become semi-asphyxiated the work tapers off and you do not get the maximum efficiency from the men from say noontime until 6 P.M.

The President (Mr. Aldrich)—Does any other member desire to discuss this question?

Mr. A. B. Macbeth, Kansas City, Mo.—In regard to what Mr. Searle said about ventilating the cellar, I think unless there was a pressure system of ventilating on the operating floor of the retort house a good deal of steam would go up between the floor plates. I think the retort house of which Mr. Searle speaks is provided with a fan supplying fresh air to the operating floor, and, therefore, that would prevent this steam from going up through the floor, there being a higher pressure you might say on top of the floor plates than there is below.

Mr. H. L. Doherty, New York—Mr. Chairman, before closing this discussion I would like to say a few words on the subject, and that is in relation to a feature often lost sight of by a great many gas engineers. I refer to the advantage of affiliating with other engineering societies. Perhaps all of the gentlemen in the room do not know that there is a society known as the American Society of Heating and Ventilating Engineers. While their work has been primarily in the nature of ventilating dwellings, assembly halls, and places of that sort, they do attempt to cover the broad ground of heating and ventilating. In my paper I touch upon the advantage of affiliation with other societies working along the same general lines as our own, and I merely wanted to use this opportunity as an example in point of what is referred to in my paper, more than for the purpose of discussing this particular subject. I will say, however, while on my feet, that my experience has been where you have a small volume of air to handle you can afford to handle it by mechanical means more economically than you can by natural draft. Where you get a large volume of air to handle you will generally find that the interest and depreciation on the stack are very much less than the operating expenses and interest and depreciation on your fans. The question of ventilating retort houses is a very important as well as an interesting one, and there is one point I might make which may prove of assistance to some engineers who have this problem to solve. Steam has a gravity of about one-half the gravity of air. It is sometimes possible to use your heat in the smokestack to produce steam, or if you have a large surplus of waste steam to turn it into the stack and get greater smokestack effect by having a greater unbalancing between hot and cold columns of air.

Mr. E. H. Earnshaw, Philadelphia, Pa.—I ask Mr. Searle how he got the steam to go up the stack—how the steam was sufficiently heated to cause an ascending current? We have found in Philadelphia in experimenting with the small stacks arranged between the benches that it was difficult to get them sufficiently hot to cause a draft. At first we put up some iron stacks and they drew very well, but in order to avoid the corrosion of the iron stacks we experimented with clay stacks made of tile, fitted together, the same size as the iron stacks. Although they were very close to the benches we found they were not a success, because the steam did not become sufficiently hot to cause a draft and they would not clear the cellar as well as the iron stacks, which transmitted the heat from the benches and caused a good draft.

Mr. R. M. Searle, Mount Vernon, N. Y.—I presume that part of our good luck was due to the enormous size of this stack, 16 feet (not inches) square. We used part of our exhaust steam in that stack, which always kept it at a certain high temperature. The climate of that country is such that the air in summer is never below 90° F., and the average temperature of the cellar before ventilating was in the neighborhood of

130°. That was caused by all the coke being pulled through the chutes, and the retort house basement filled and the coke quenched in a pile as it accumulated in the basement acting in a sense as a hopper for the hot coke from the retort, and the temperature would rise rapidly. Five benches or 15 retorts were in process of being pulled at the same time, which made a terrific heat and caused a terrific draft. It was much cheaper to operate that way with negro labor, and working one side of the house at a time under one foreman. Referring to the blast pressure system, that was simply a series of nozzles, so arranged as to play on the backs of the negroes with air taken from the retort house at the same temperature as the air on the operating floor, to keep the men from getting cold and at the same time evaporating the moisture on their bodies to keep the temperature down. It had little other effect. It was simply a No. 5 Sturtevant fan and could not handle much over 500,000 feet of air per hour at the rate it was delivered to the pipes. It would have required something like 100,000 feet of air per minute to ventilate the building. I might mention further that we removed every window in the retort house and the window frames in order to get a still further diameter of window opening. We removed a portion of the roof and took out everything that was possible so as to make as large openings in the retort house as practicable. All the house openings were made larger, practically bringing the operating floor into the external atmosphere.

The President (Mr. Aldrich)—We will be glad to have Mr. Lotz close the discussion.

Mr. Lotz—I wish to reply to the remark of Mr. Searle, regarding the danger of an explosion in connection with the system described by me. In the first place, the temperature of the coke and steam, when the steam is formed, is below the ignition point of the gases in the hopper. Again, it takes a certain amount of time to quench the coke. In no retort house is all the water thrown on all the coke at one time. If that were the case, you would need an excessively large apparatus to take care of it, but the fact of the matter is that the quenching is dragged out and prolonged, say over a period of 5 minutes. Assuming that length of time as a standard, you can divide the amount of the total gases generated by quenching the coke by 5 minutes, which will materially cut down the total amount of gases handled by the fan, and at no time is there so much steam formed under these circumstances as to even give you a steam explosion, and the current of air going through the hopper is all that is necessary to take care of it. That air goes through the hopper at the rate of pretty nearly half a mile a minute, gathering up the steam and gases as fast as formed. As far as the steam going up through the cracks of the charging floor is concerned, that is a practical impossibility, because the hopper is entirely closed, and all the suction that it gets is from one end and through the cracks right above it, so that the tendency is to suck everything down and into it instead of allowing it to escape.

On motion of Mr. Donald McDonald of Louisville, Ky., the thanks of the Association were tendered to Mr. Lotz for his very able paper.

The motion was duly carried.

The President (Mr. Aldrich)—The next business on the programme is the paper by that Past-Master in such things, Mr. Henry L. Doherty, of New York.

Mr. Doherty—I have written several papers which I have read before various Associations, and as a rule I never apologized for them. I am not going to apologize now, but I want to make an explanation. As you know, the selection of papers for this Congress was made at a rather late day. The subject assigned me was of a nature which compelled me to depend upon other people for the material on which to base my paper. I did not wait for this material, but dictated an outline of a paper and tried to gather it in and put it in proper statistical shape. It was very difficult to get the information desi.ed, and some of it had to be taken from the GAS LIGHT JOURNALS, and the proceedings of the various Gas Associations. The result was we did not finish the work until last Friday. When I left Denver that day there was some little correction work to do, and owing to the numerous delays incident to its preparation I regret that the paper is not wholly in print. You have a part of it before you in pamphlet form, and from its length you would naturally suppose it is all there, but it is not. If I had had time I would have collated this part (exhibiting manuscript) and added other data to it. A portion of the paper has not yet been put in final sh-pe. This will be done later. It will consist of a large amount of statistical matter, showing just who have contributed to Association work, what percentage they represent of the total number of men belonging to the Associations, what percentage they represent of the total number of men engaged in the gas business, and in this way I shall endeavor to give you an exact line on Association work as it exists today. Unfortunately, the summary of these statistics is not here and I cannot remember them, so you will have to wait for that part of the paper until it is put in final shape. I shall abstract the paper, so as not to detain you too long. Mr. Doherty then read his paper entitled

GAS ASSOCIATION WORK.

This is a broad subject on which there is great opportunity for difference of opinion. Each man's experience and situation give him a view-point varying slightly from that of any other member of the gas fraternity, and perhaps diametrically opposed to that of some members. Had we all had like experiences, and were we working under exactly similar conditions, probably no great difference of opinion would exist. It is perhaps safe to assume that we all agree that some improvement can be secured in association work. The extent of this improvement would, however, be largely a matter of opinion.

It is my purpose to present certain views to you which I hope will at least furnish food for thought and lead to an interesting discussion. The views presented will be fragments of thought which have occurred to me from time to time, and which I may be able to again recall from memory. The request for a paper was received at too late a date for me to give the subject careful thought and considerati n which it deserves. My contribution must, therefore, be in the nature of "thinking out loud." The subject, however, is so vital to all our interests that considerable time should be given for consideration before any radical changes are made. It is not enough to secure a slight improvement. It is a question of planning and working to obtain not better, but best results.

This cannot be done in a day or a minute. A standing board should be created or a single investigator appointed to plan and report progress from time to time. You will notice that I used the word board and not the word committee. Just what the distinction should properly be between a board and a committee I do not know, but as a rule a committee is a body of men appointed to do work that it never does, and it may prevent the work from being done by volunteers. If a committee does accomplish any work, as a rule it is but one man on the committee who does it. Perhaps the best results toward progress could be secured by each association appointing a representative, and each holding its one representative responsible for progress regardless of what other representatives might do. All of these representatives could compose a board with provision for at least one annual meeting, and this board collectively and these representatives individually would be charged with the responsibility of securing better results from association work.

In spite of differences of opinion, I think that we can all start from the broad ground that some improvement in association work is possible. As gas associations depend for their existence primarily upon the gas business, and upon the individual men conducting the gas business, it seems necessary to study association work and association possibilities from the standpoint of the conditions of the gas business and of the individuals making up the gas fraternity, rather than to attempt to study the gas association *per se*.

The Nature of the Gas Business.—There is a difference between the gas business and almost any other business which cannot be readily understood, but a recognition of this distinction, which may at first seem slight, will possibly be sufficient to cause the difference between success and failure. The business is complicated in character and has peculiarities of its own. It cannot be advantageously considered as a whole and must, therefore, be divided into different parts. For convenience, the following divisions may be made:

(a) It is a manufacturing business;
(b) It is a transportation business;
(c) It is a collection business;
(d) It is an investment business;
(e) It is a mercantile business;
(f) Its successful conduct requires that it should be a development business.

Other lines of business may embrace some or all of these features, but the peculiar relationship between these branches makes the gas business almost unique in comparison with other lines of business.

There is one great distinction that should always be kept in mind. In almost any other business the owners or directors may at will limit the demands made on it, while the maximum demand for the supply of gas is absolutely within the hands of the consumers, and we must anticipate and incur the necessary investment to provide for supplying this demand which our consumers may choose to place upon us. A street railway company tries to anticipate the demands of the public, but failing to do so, the public must wait to be cared for at the railroad company's convenience. A hotel provides capacity for a certain number of guests. Excessive demands made upon it are refused. It is only the

gas company, the electric company and the water company which must adapt themselves to the maximum demands of their patrons, and failing so to do the service is completely and fatally crippled.

The Condition of Our Manufacturing Business.—The best conditions in the manufacturing end of our business are not as good as they might be, the average conditions are far from good, and the poor conditions are extremely bad. This may be neither a popular nor a pleasing statement, but if we hope to reach any conclusion in discussing this subject, we must at least be truthful with ourselves. Perhaps one or two examples are necessary to support this broad statement. Almost any portion of our apparatus or methods would answer for this purpose, but as my first example I will take our ordinary coal gas bench. It is of unknown efficiency, no standard or recognized method of determining its efficiency exists; its present design is faulty and involves serious losses inherent to this design.

As my second example I might take the fuel economies in and about a gas works. They are generally bad. As far as I know, no comprehensive attempt has ever been made by our gas associations to better these conditions or to determine what constitutes best practice. There is no standard method of conducting steam in and about a gas works. Membership must be had in societies other than gas associations in order to keep in touch with progress in steam engineering and fuel economies.

As my third example I might take our present water gas machine, perbaps the highest type of gas works apparatus. For this apparatus we have only Mr. Glasgow's paper, now many years old, as a criterion of the efficiency of our present water gas generators, with no organized efforts to create a standard for measuring the efficiency of this class of apparatus. Whether or not we should rest content with the present efficiency of this apparatus, each individual can answer for himself. Like examples might be extended to almost all of our other apparatus. That these machines are not as efficient as present engineering practice would permit is a statement that need not be argued here, unless it should be questioned. If necessary, I will defend my views as above stated.

The Condition of our Transportation Business.—Our distribution problems have probably received less attention and intelligent treatment than has our manufacturing business. It is doubtful whether reasonable care generally prevails in this department. Mains and services are often laid without inspection or testing. Sizes of mains are generally determined by guesswork, and association work to date has done little to secure a greater degree of accuracy in these individual guesses.

In planning a distributing system it is almost entirely a problem in maximum demands regardless of consumption. How much literature can be found and how much work has been done by the gas associations to determine demands under certain known conditions? There are few distributing systems which could not have been installed at a cost of 20 to 50 per cent. less and yet have yielded greater conductivity and better regulation of pressure. No recording maximum demand devices are used by gas companies. Most rules for distributing gas are of a traditional nature with nothing to show that the establishment of the rule was anything more than a wild guess.

Our leakage records are generally of doubtful accuracy. Leakage is generally stated in terms of percentage, and this means nothing definite. A leakage of 10 0,000 cubic feet per mile of main may mean 1 per cent. to some companies and 50 per cent. to other companies, or 1 per cent. in a portion of our distributing system and 50 per cent. in another. It should be the ambition of gas engineers to make their distributing systems bottle-tight, and apparently there is not the interest shown in this problem that it deserves.

Our distribution costs are fixed by other factors than our consumption, and most of our expenses are of a constant aggregate value. The distribution cost per 1,000 feet of gas depends chiefly upon, first, the volume of our consumption; second, the relation of consumption to maximum demand. Gas association work furnishes little information on these points.

It is not my attempt to point out all of the possible improvements over present practice, but I am simply trying to cite an example here and there to sustain my contention that association work is not what it might be.

The Condition of our Collection Business.—The present gas meter leaves little to be desired in the way of accuracy, no matter what its other shortcomings may be. Such inaccuracy as does exist with gas meters and their present cost of maintenance is largely due to our lack of knowledge of individual demands made by certain classes of consumers, the irrational construction of our present meter, lack of knowledge of the capacity of meters, and failure to protect the meter against excessive demands causing considerable differential pressure in the working parts of the meter tending to destroy it. Association work until recently has done but little on any of these lines. The present meter can be materially improved, but most easily by association work, instead of by individual effort.

The accuracy of meter readings in different companies varies considerably. Within my arm's reach, while dictating this paper, are two reports from different companies of about the same size, showing that of 18,000 meters read by one company over 100 mistakes in meter reading were made, while with the other company only 8 mistakes were made in reading 32,000 meters. Both reports are probably accurate. The great difference is explained by the methods in vogue by the two companies.

The nature of our collection expenses is not always kept closely in mind. They are in no way related to our consumption, but depend almost directly upon the number of our consumers. It is a certain fixed amount per consumer, and the cost of our collection expenses per 1,000 feet of gas sold to individual consumers may vary as much as 1 is to 500, and even beyond this to infinity.

Our Methods of Accounting.—Here the gas associations have done some excellent work reflecting much credit upon the contributers in this branch. The work, however, should be of a continuous rather than a spasmodic nature, as conditions are constantly changing and we never secure perfection.

Our Investment and the Relation of Its Yearly Expenses to Our Other Expenses.—After all, our business is primarily an investment business. Failure to recognize this point and impress it on the public has jeopardized the security of our investment. The public seems to think that our only expenses are the purchase of coal and the payment of a small amount for labor. It cannot see why we cannot afford to sell gas at 5 per cent. above its manufacturing cost. It insists upon considering operating expenses alone in comparison with gross receipts. Our business can in a measure be likened to an investment in buildings, say like the ownership of apartment houses in New York. In some of these buildings the only operating expense devolving upon the owner is heat and janitor service. If the owner is not entitled to any reasonable return on his investment, his profits above operating expenses are enormous.

It is probably our fault that the public takes an incorrect view of our business, and the responsibility for this condition rests with the men responsible for the successful conduct of the gas business. The public often thinks our profits are excessive, many believing they are 100 per cent. or more. Even the experienced gas man seems to forget that the average American gas company would be fortunate if able to take back its actual investment in gross receipts once in 5 years. This means that total receipts are only 20 per cent. of the actual investment, and if gas companies had no expenses whatever, their profits would be limited to this amount. It would be hard for the public to be made to understand that as a rule the gas business is not nearly as productive, per dollar of actual investment as almost any other class of business. We ourselves fail to keep clearly in mind that profit per 1,000 cubic feet of gas sold and profit on the investment required may not be related. For a given profit on our investment we are better off with a small profit per 1,000 cubic feet of gas sold than with a large profit per 1,000 cubic feet of gas sold.

Taxation Conditions Peculiar to Quasi-Public Corporations.—For lack of just tax laws and in justice to our stockholders, we are compelled to fight for a low valuation on our property for the purposes of taxation and a higher valuation for the purpose of fixing rates. The present trend of tax valuation is inimical to the safety of our investment. This is true of our quasi-public corporations and of no other taxpayers as a class. Little can be done by individual effort, and it is incumbent upon our gas associations to co-operate with other quasi-public corporations to secure taxation laws which will place just burdens on all taxpayers. Many companies are suffering now, and all will eventually suffer, unless something is done to guide the present tendency of taxation methods. There was a time when quasi-public corporations seemed to be able to dodge their just burdens of taxation, but to-day the quasi-public corporation is indeed fortunate that does not have to pay more, and considerably more than its just proportion of taxes.

Our Mercantile and Appliance Business.—There was a time when gas companies were sati fied to do business only to the extent of their monopoly. That time has fortunately gone by. For the sake of developing our business many of us have been forced into the mercantile business, including the providing of appliances for our possible patrons. To secure reasonable cost of manufacture we have also been compelled in some cases to market our residuals either to the consumer

or to the jobber. Most gas companies have coke for sale. No uniform sizes of coke are supplied by the gas companies and no uniform names are used to designate the different sizes. Manufacturing companies making coke-burning stoves and furnaces cannot even publish in their circulars the sizes of coke that the owners of the stoves should ask for in any two towns. To develop our market for coke and secure a proper demand insuring a good price, the appliances should be designed for the proper burning of coke or the coke should be prepared for the appliances that are available. If the gas associations have done any effective work along these lines, the writer is unfamiliar with it.

Our gas appliance business presents plenty of room for improvement. None of the appliances seem to approach a fair degree of perfection. Vast room for improvement exists with most of them. This improvement could be secured by simply applying known and recognized laws of engineering already made available by many text books. No standard method of testing gas appliances has existed until of late. No aggressive work has been done by the gas associations to secure improvement in these appliances nor to cultivate the development of new appliances opening up other fields for the use of gas. There does not even seem to be a unanimity of opinion amongst gas companies regarding the nature of appliances which it would be most advantageous for them to cultivate. Some gas companies advocate the use of instantaneous water heaters, while others discourage them. Some gas companies seem to aggressively push the sale of hot plates, while others discourage them. Data could be secured and brought out by our gas associations on these points, but no particular effort has been made to do so.

The Development of Our Market and Our Opportunities.—To what extent our market can be developed and what opportunities exist for the use of gas with which we are not generally familiar every reader must judge for himself. There are many gas companies that sell over 5,000 feet of gas per capita. Other apparently well managed companies in similar communities sell only 2,000 feet of gas per capita. The reason for this difference is not apparent, and association proceedings do not throw much light on the puzzle.

Development of gas burning appliances and ability to secure greater economy in the use of these appliances should open up considerable opportunity for increasing the sales of gas without materially increasing the company's investment. Gas appliances used extensively in one community may not even be known in many other communities, and if known at all there is no definite knowledge of the results to be secured from their use. One gas company recently attempted to collect a list of all purposes for which gas was used and a description of all gas burning appliances, together with their cost of operation, etc., and the support, or rather lack of support, given this movement by the gas companies of the country was rather discouraging.

It is the work indicated by these examples which gas associations can do and which would prove of great value to the future of the business.

General Comment on these Examples.—In general it is safe to say that problems in the gas business have been accumulating much faster than the associations have been disposing of them. Gas associations may be limited in their ability to secure improvement in maximum results, but it should be no great effort and would only call for good organization work to bring the average results and the poorer results nearer to our present best results. Some gas companies may not be fully alive to their own interests, may not appreciate the necessities of the immediate future, and may not be ready for the adoption of association work on a more comprehensive plan; but gas associations should at least do all within their power for those gas companies and those members of the fraternity who are ready to receive something better in improved methods and apparatus. There are reasons for the apathy of gas companies and members of the gas fraternity which perhaps deserve consideration.

Gas Literature: Its Availability and Condition.—Our literature is fragmentary and indefinite. There are practically 1,000 gas companies in this country, many of which are small and unprogressive. The field for gas literature is too limited to bring financial success to authors or publishers to the same extent, for instance, as in the electrical business. There are nearly 4,000 central stations in this country, and the Institute of Electrical Engineers has over 3,000 members. In addition to this, there are over 100,000 electricians, amateur or professional.

Our literature is scattered through many publications and contained in many books, some out of print and not now available. The engineer starting in the gas business at the present time has little opportunity to put together a proper library. Gas literature has not been properly digested or indexed. The recent attempt of one of the gas associations to publish an index is rather disappointing. It is incomplete and lacks effectiveness because the title assigned certain papers is the only subject indexed. For instance, one card is indexed for a subject "An Unnamed Paper." There is absolutely nothing to indicate to what the paper relates. There are many other titles equally ambiguous, and data on one subject may be buried under a title entirely foreign to it, or at least under a title not reflecting the true character of the paper. To thoroughly follow up any line of study by the use of this index would be impossible.

It is unfortunate that no rules have ever been laid down for so naming papers and cross-indexing them that their contents may be readily determined and located. Some work should be done by gas associations to insure greater care in assigning titles to papers, and to insure proper sub-titling to different portions or to different subjects if more than one subject is treated.

The lack of availability of gas literature cannot be dwelt upon too forcibly. Almost any public library furnishes some text books on other branches of engineering, which at least in a degree cover the whole subject. Few books directly or indirectly related to gas engineering will be found in the libraries, and the trade journals on gas engineering are necessarily of such limited circulation that they will be found on the tables of only a few engineering clubs and scientific societies. To properly cover the field of gas engineering a great many expensive text books must be had, and of these text books some are out of print, and the young engineer is financially unable to provide his own library with others and has no public library to fall back upon. Even with the present available indexes and with the most complete gas library, it is difficult to pick out quickly what is wanted. Our literature, such as it is, is encumbered with a great mass of badly arranged indifferent contributions. Opinions or statements without corroborative detail are extremely common. What we need most of all is a handbook on gas engineering which would correspond with Kent's handbook on mechanical engineering. The publication of such a handbook would not be a profitable financial venture unless supported by our associations, but on 1,000 leaves of onion-skin paper contained in covers of no greater dimensions than 6½ inches by 4 inches by 1½ inches can be put more available information of value to the gas engineer than is contained in any gas engineering library with which the writer is acquainted.

Engineers in many branches have been largely educated simply by such scientific matter as is contained in catalogues. Catalogues of gas apparatus manufacturers have heretofore been lacking in educational matter. A recent bulletin on gas benches, however, issued by one manufacturer, was most excellent. A great deal of information necessary for the intelligent operation of gas benches was contained therein and was well told. The author of the pamphlet had availed himself freely of the recent progress report on bench construction and operation appearing in the proceedings of two of our gas associations. Another manufacturer with whom I corresponded some time ago was anxious to print a catalogue containing a great deal of valuable technical data. This data, however, was not available and the project was abandoned. In other lines of work it is often the apparatus manufacturer who is responsible for educating the masses, but he should be more properly the distributer of educational matter and not the student and investigator who prepares it. Were the gas associations to make greater efforts in research and other work, a great deal of the valuable information secured by them would find its way into the hands of the gas fraternity through the manufacturer of apparatus and appliances.

The Condition of Our Nomenclature.—No attempt, so far as the writer knows, has ever been made to standardize the nomenclature of gas engineering and to adopt valuable and comprehensive nomenclature used in other branches of engineering. There are some half dozen different names for different styles of gas benches. Lack of standardization in this one point alone is confusing and is liable to lead to errors. The expression "candle foot" means one thing in the gas business and something entirely different in all other branches of science. With the gas engineer it is the product of his candle power times the yield, and as our photometric work is based on a unit of 5 feet of gas rather than a unit of 1 foot of gas, the so-called "candle foot" is equivalent to one-fifth of a candle power hour in illuminating value. It is to be regretted that we have adopted by custom a standard of 5 cubic feet as a unit in stating the candle power of our gas, and it would have been less confusing had we adopted 1 cubic foot. However, there is no excuse for the continuance of the term "candle foot" as it is now used, and we should adopt the use of the term "candle foot" in the same sense as other engineers use it—viz., the unit of intensity of light.

The nomenclature of the gas business is most faulty from the standpoint of omissions. Terms used in other branches of engineering, which comprise a great deal in a single word, phrase or character, could to

advantage be adopted by the gas engineer. This is another field for association work, but before starting to consider association work directly, we should consider the condition of the men composing the gas fraternity.

Study of the Men Operating and Directing the Gas Business.—The major portion of the gas fraternity to-day is composed of self-educated men. Of those having a technical education only a few were educated with the view of entering the gas business. No school or university offers a recognized course of gas engineering. The gas business was formerly carried on as a craft, but is gradually undergoing a change and will eventually be carried on as a science. This evolution has already progressed materially, and it is reasonable to suppose that there will be a constant acceleration of progress.

Barring a few of the old school of gas men, the balance were what we might classify under the greatly abused term of "practical men." They were not scientists, their education was limited, and they were at least indifferent to scientific methods and technical training. Indifference is hardly the word to use, for in most quarters there was, and in many quarters there is to-day, opposition to technically trained men and to scientific and exact methods. The young graduate engineer did not always find his surroundings in the gas business congenial and agreeable, and lack of association with other college men and opposition from his associates have caused the gas business to be regarded by men of this stamp, until very recent years, an uninviting field. Fortunately, these obstacles are being overcome, and some of our best technical schools advise their engineering students to enter the gas business.

The remarkable progress made by college educated men in the gas business has also been an incentive for others to endure the direct opposition, and sometimes ridicule, to which they have been compelled to subject themselves. Many college educated men, who were as yet unborn or who were babies when the American Gas Light Association was formed, are now holding positions of great responsibility at remunerative salaries amongst the American gas companies.

The writer was once employed by a gas company whose superintendent could neither read nor write, and afterwards took charge of another gas company whose superintendent could neither read nor write. Although remarkable men in their may, they would be entirely out of place with our present methods, and yet these two men were securing results even better than average results of all gas companies throughout the country at that time. The gas business embraces men with all degrees of education, from that of the two examples which I have just cited, to men of national and even international reputation in several branches of scientific work. The standard of ability and general education is extremely high; the standard of special and technical education is not so high. Individual and average progress has been rapid, and the writer ventures the opinion that the average gas man of to-day has progressed much more rapidly than has the average gas association.

The man who may have been a leader in the gas fraternity 20 years ago may be an obstacle to progress to-day. Many of these men insist, in spite of increased knowledge and changed conditions, on following what was considered good practice 20 years ago. They do not take kindly to proposed changes and prefer to see the business conducted along the lines of traditions of doubtful origin.

Admitting that the above statements are true, it is very easy to see how opinions may differ, or rather how viewpoints may differ. Conditions are changing and we must change to meet them. It is simply a question of whether we will anticipate these conditions or have our policies made and forced upon us—whether we shall be the prime mover or the driven motor.

The Standing of the Gas Engineer in Professional Circles.—It is to be regretted that a gas engineer has practically no recognized standing amongst professional men. The knowledge and training necessary to make a man an electrical engineer are fairly well defined. The same is true of our mechanical engineers and even of our chemical engineers. It is doubtful whether any two men in this audience would give the same answer to the question, "What constitutes a gas engineer?" Some time or other we, as members of the gas fraternity, must speak through our associations and say what does constitute a gas engineer, and it is, therefore, an opportune question whether gas engineering shall be confined to the narrow limit of coal and water gas, or whether it shall be a broad term, such as electrical engineering, wherein the telephone, telegraph, high tension and storage battery engineers all assemble under one banner.

You are all aware that industrial gas plants are being adopted rapidly. You also know that in the past few years several million dollars have been invested in the manufacture of large gas engines, and that in the minds of many, and perhaps most of the recognized authorities on engineering, the gas engine is believed to be the prime mover of the future. And yet our associations have thus far taken but little notice of these conditions. There is no particular incentive for the men engaged in this work to join our ranks, and it is doubtful whether many of the members of our various gas associations have made any great effort to keep in touch with the men who are dealing with these problems on such a gigantic scale. It is unreasonable for us to suppose that there is nothing that we can learn from men engaged upon these problems, and it is highly probable that within the next few years the bulk of all the gas, no matter by what standard you may measure it, either in volume or money value, will be used for industrial purposes and perhaps primarily for the generation of power. Unless we take the lead, we may find ourselves the followers rather than the leaders.

The suggestion of one of our Western members, that some college be induced to give a degree of gas engineering does not appeal to me as the proper starting point. We should, first, determine what constitutes a gas engineer and how he should be trained, and only then would the degree of gas engineering have any real meaning. As the matter stands to-day, many of us are devoting our lives, or at least the best years of our lives, to a branch of engineering work which is not recognized by other professional engineers. This brings us to the problem of

Proper Education.—It is probably not the wish of anybody that the men lacking in technical training should be eliminated from the gas business. These men, with their valuable practical experience and by association with technically-trained men, can make themselves extremely valuable. They are the kind of men who can never be entirely eliminated, and there is no desire to do so, but the gas business already possesses a preponderance of this class of men, and it seems desirable that the new recruits should come to the gas business thoroughly educated and possessing all the necessary fundamental knowledge to enable them to take up the special problems of the gas business. This, to the writer's mind, means a college educated man and educated for the purpose of entering the gas business, but until some course in gas engineering is provided, it probably means a well educated mechanical engineer with special training in chemistry, thermochemistry, heat, combustion, thermodynamics, physics and economics.

The Advantages and Disadvantages of a College Education.—It is not hard to find men in the gas business who have an outspoken contempt for a college education. This is due, in a large measure, to a misunderstanding of the difference between a classical and an engineering education. Some of the graduates from classical schools who have entered upon ordinary business work, financiering, pawnbroking, or other like professions, have brought the whole college fraternity into disrepute. There are some classes of work where a classical college education is at least of very doubtful value, and to the writer's mind, is an absolute disadvantage.

The American people measure success by a man's money-getting powers, and the average money getter has little or no need for education. These men contribute their share toward the world's progress, but they are an element that could be sacrificed with less retardation to progress than could other elements which the public forget and whose leaders are probably unknown to the general public. It is the engineer, the scientist and the inventor who have made this world pleasant to live in, and these men are now gradually receiving recognition. For this and other reasons, engineering is becoming a more popular branch of study and a more respected profession.

It is absurd to suppose that you can take 4 years of a man's life for special education and not be able to better educate him than to rely upon the information he may pick up by chance in some occupation providing for daily routine. If such is not the case, it simply means that our present methods of education are all wrong, and perhaps the responsibility for this condition rests on the men like ourselves. If a college education spoils a man, it should be so changed that it would benefit him, and if we are the men who take it upon ourselves to insist that a college education does spoil him, it is at least in a measure incumbent upon us to indicate how this college work should be changed to make this man useful to us.

Careful statistics on the progress of college educated men would, I think, surprise many people that now ridicule the value of college education. Dr. William W. Smith, Chancellor of the Randolph-Macon College, has recently published some information on this problem. From the last United States census, it appears that there were 14,794,403 males over 30 years old. The United States Bureau of Education estimates that these are divided educationally as follows:

	Number.	Per Cent.
Class 1.—Without education	1,757,023	11.88
Class 2.—With only common school training or trained outside of organized schools	12,054,335	81.48
Class 3.—With regular high school training added	657,432	4.44
Class 4.—With college or higher education added.	325,613	2.20

Taking the publication of "Who's Who in America," he shows that, of 10,704 notable people,

	Per Cent.
24 were self-taught, or	0.22
278 were home taught, or	2.60
1,066 had common school training only, or	9.96
1,627 had high school training, or	15.20
7,709 were college trained, or	72.02

Making the very remarkable showing that, while the college trained man represents only 2.2 of the male population, over 30 years old, yet 72.02 per cent. of the notables came from 2.2 per cent. of the population. I do not care to accept the responsibility of drawing an absolute conclusion from this showing, without qualifying explanations which would be out of place here, but the figures are submitted for what they are worth. A relation should exist between our various engineering associations and these educational institutions, and simply because the educational institution does not cultivate us, we are not thereby relieved from our responsibility to cultivate them.

With this introduction I think we are now prepared to consider what our association work should be, and this would be an easy matter to state could a pattern be found which we should follow.

Is There Any Ideal Association Which We May Copy?—We can advantageously study the methods of other associations. The intelligent and aggressive policy of the American Institute of Electrical Engineers at least offers inspiration. It requires effort for me to restrain myself from paying glowing tribute to some of the active workers of that society. Only my inability to determine where to stop deters me from doing so. They have the largest number of real workers of any association with which I am acquainted, and these workers not only stand for progress but they actively promote it. The National Electric Light Association is another society which stands for achievement. For a semi-technical association its work perhaps excels any other association of a like character.

Much of the work brought out by the American Society of Mechanical Engineers is exceedingly high grade. The work of Mr. F. W. Taylor is particularly valuable and interesting. His recent paper on "Shop Management" is especially original and is equally valuable to members and to many men outside that society's membership. To the writer's mind, this paper is the first full step towards putting management on the plane of a science rather than a demonstration of the tal ents born in a man. Possibly all of the big societies have features which could be advantageously adopted by us, but the ideal association does not exist because the economics of association management have not been recognized as a definite study demanding special treatment.

The Distinction between Gas and Other Engineering Societies.—The gas business is distinctive and the problems of gas engineering are peculiarly extensive. A good gas engineer would need to have an education in every branch of engineering, with the possible exception of electrical engineering. The lack of special college courses for gas engineering demands a distinction between our association work and the association work of others. The commercial nature of many of the problems which we face also calls for a distinction. The lack of uniformity of the opinions, education and condition of the men composing the gas fraternity likewise demands distinction. The quasi-public character of our business must also be considered. The condition of our literature demands special treatment. Inability to secure investigation and research work by the individual members of the gas fraternity must likewise be considered. The writer must, therefore, conclude that no ideal association exists after which we may copy, and that our conditions are so unique that we must analyze the problem which confronts us and then by synthesis build up an organization calculated to meet our special requirements.

Before attempting to discuss specifically what the ideal gas association should be, I would like to outline the plans of one gas association, and it may offer some suggestions for the formation of a plan for the ideal gas association.

A Brief History and an Outline of the Policy of one Gas Association.—Until recently the association of which I speak was conducted in much the same manner as all associations. At a meeting of the officers and some of the prominent members of this association the problems confronting the gas fraternity were discussed and the following conclusions were reached:

1. That problems were piling up in the gas business faster than they were being disposed of.

2. That the number of active workers in association work was too small to insure a disposal of these problems.

3. That a gas engineer had no distinct recognized standing amongst other professional engineers.

4. That gas associations could advantageously co-operate with other engineering societies.

5. That to properly solve the problems of the gas business, they must be specified in some manner and be disposed of in the order of their importance.

6. That all of the men capable of doing valuable association work must in some way be located and encouraged to contribute.

7. That some effective means should be adopted to encourage research and investigation work.

8. That means should be taken to render gas literature more extensive and available.

9. That the ideal gas association would be that association wherein each member was doing some individual work for the benefit of the entire gas fraternity.

From these conclusions it was decided (first) to apportion out from time to time special work to some one man charged with the duty of keeping track of this matter and reporting progress to the association at each convention; second, it was decided to start some popular movement whereby all who were willing so to do could contribute to the association. This finally resulted in the establishment of the Question Box on a comprehensive scale, the idea being that it would locate men capable of contributing and that there would be no good excuse other than unwillingness for any member of the gas fraternity refusing to make some sort of a contribution; third, it was proposed to inaugurate a Research Department, outlining all subjects upon which useful research and investigation work could be done, and in order to induce effort and reward achievement it was proposed to award the contributers certificates of appreciation expressing proper recognition of their work.

The association to which I refer was until recently of limited membership. Its usefulness is still curtailed, although not so much as in the past, by lack of funds; but the above are the general plans and policy of the association, although few of the details can be given here. One feature, however, has recently been added, namely, a Revision Committee, whose duty it will be to take up the Question Box and as far as possible annotate and correct the answers. A question coming to the association will first reach the Question Box, then the Revision Committee, and if not fully and satisfactorily answered, it will be put in the Research Department and a certificate of appreciation offered for its solution. This in a way is a comprehensive scheme to secure better results in association work. The whole plan of this association is open for the investigation of anyone and for the adoption by other associations of any portion that seems worthy of adoption. It is also their wish to adopt any desirable innovations which may be made by other associations, whether gas associations or not.

Competition Amongst Associations.—It is a noticeable fact that there has been more interest shown in gas association work in the past 2 or 3 years than ever before. This interest is at present manifested in the form of competition, and if this can be confined to friendly competition without making us forget that the real object of our efforts is not association advancement, but fraternity advancement, its stimulating influence will be extremely beneficial. Competition to the point of extreme stimulation is unquestionably desirable in everything, but competition beyond that point, and when it becomes destructive, is universally undesirable.

Criticisms of Present Association Work.—Excepting for some recent improvements, my criticisms on association work as now conducted would be about as follows:

1. The orginazation plan is such that sufficient funds are not provided for carrying on the work on a proper scale.

2. Association work lacks continuity and conclusiveness.

3. The annual convention is too prominent a feature of association work, or rather there is little or no work done except with the convention in view as an end.

4. The limited time at the disposal of a convention is wholly inadequate for a solution of the problems to be solved, and either the work of the convention must be supplemented or else their time must be extended.

5. The selection of subjects for consideration at these conventions does not reflect on the face the careful forethought that our problems deserve.

It certainly must be axiomatic that if our time is limited and only a few subjects can be considered, then those should be selected which are of the most importance to the gas business.

6. Committee work lacks aggresiveness. It should be made plain to the members that no one should accept committee appointments unless he is willing to work, and it should be the duty of the officers of the association to see that the committees discharge any task which they assume.

7. Very little work has been done to secure standard apparatus and standard methods. No attempt has been made to standardize gas nomenclature, methods of testing apparatus used in gas manufacture and distribution, sizes of coke and names thereof, and no comprehensive attempt has been made to standardize distribution records and other records of equal importance.

8. No comprehensive plan has been adopted or even attempted for carrying on research and investigation work. Such work as has been done has been delegated to a very few men who could not work out even a major portion of our problems in a lifetime.

9. Litigation crops up from time to time with different gas companies, especially relating to public control, in which adverse decisions are apt to be extremely harmful and prejudicial to our present properties and their future development, and no attempt has been made by our associations to assist or advise in these litigations, which may for lack of a proper defence result in adverse decisions involving other companies in litigation and lessening their opportunity for successful defence owing to a precedent having already been established.

10. There is a lack of co-operation with other engineering societies in spite of the fact that such co-operation would be beneficial.

11. With the exception of one State organization to which I have not heretofore referred, no attempt has been made to co-operate with educational institutions, and yet here are a large number of schools equipped for making tests and doing all sorts of scientific work, which would be only too glad to co-operate in the solution of many problems which gas engineers encounter, and many of the students, instructors and professors could be directed in doing research and investigation work which would benefit us.

12. No attempt has been made to induce gas companies to encourage their men to do original work for the benefit of gas associations.

13. No great attempt has been made to secure voluntary contributions and to put the gas associations in a position where they could discriminate in the matter that they would use in making up their programmes.

14. There are not enough members and attendants at conventions who contribute to the proceedings.

15. Office holding is regarded as an honor rather than a duty.

(To be Continued.)

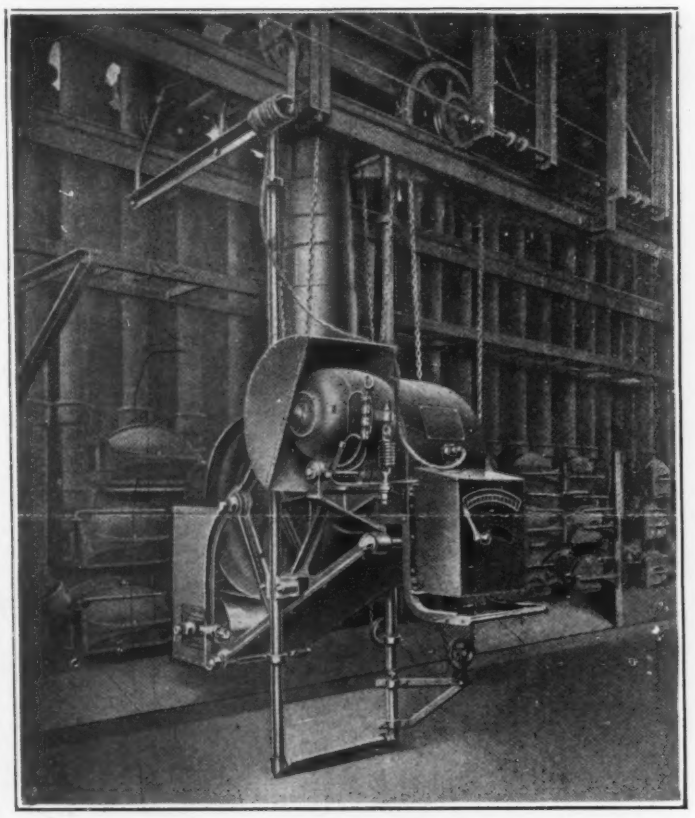
The De Brouwer Coal Projector for Horizontal Retorts.

In view of the great interest aroused in this country through the open and public advocacy of the De Brouwer coal projector by many of our most prominent gas engineers, the following matter descriptive of it by means of pictures and pen, recently put out by Messrs. Bartlett, Hayward & Co., of Baltimore, Md., will no doubt be acceptably received:

The intention of reducing the cost of retort house labor to a minimum and to relieve the retort house men of hard work and exposure to heat, has been the cause of many ingenious inventions for charging and discharging horizontal retorts. Effort to obtain the desired results led to the construction of the so called inclined retort system, which latter was a decided step in the right direction, as it did not only accomplish the desired results with reference to the reduction in cost of labor and proper conditions for the men under which to operate, but it also permitted of producing a larger amount of gas per square foot of area, for the reason that the retorts could be filled to a greater capacity, because scoops or rakes were not required for the charging and discharging of the retorts.

The most successful charging and drawing machines for the horizontal retort system at the present time are all based upon the mechanical introduction of scoops and rakes to charge and discharge the retorts, thus requiring a certain amount of space for the operation of the scoops and rakes. For charging and drawing machines of this type, cumbersome apparatus mounted on heavy carriages was designed and operated either by steam power, supplied from the boiler mounted on the same carriage, or compressed air furnished from an accumulator system located at a distant point.

The well established advantages of the inclined retort system over all



horizontal systems charged and discharged by machines constructed on the scoop and rake principle, led to the construction of the "De Brouwer" and "Bertrand" charging and discharging machines, for the reason that they exclude the use of scoops and rakes. In both machines the coal is deposited in the retorts by centrifugal force and is discharged by a ram entering the retort on one end and pushing out the coke at the opposite end. With the use of these machines for horizontal retorts, the advantages of the inclined system, consisting principally in the reduction of cost of labor and increase in gas production per square foot of area, are closely approached and will no doubt therefore lead to the rapid introduction of these new charging and discharging machines, particularly as they require for their operation electrical power, obtainable at comparatively small cost either from existing electrical companies or from a comparatively inexpensive local power installation.

Description.—The chief operating part of the projector is a grooved wheel, *F*, Figs. 1 and 2, of 40 inches diameter, having a rectangular groove in the rim, as shown in Fig. 4. One-fourth of the grooved wheel is covered with a leather belt, *G*, and together they form a movable channel from which the coal is projected by centrifugal force into the retort in a perfectly continuous stream. The driving wheel, *H*, is driven by a paper friction wheel, *L*, mounted on the armature shaft of an electric motor, *K*, which is supported upon a swivel connection so that the necessary friction between the wheels can be obtained by the adjustable spring *m*. At the top of the projector is a measuring chamber, *C*, of one retort capacity, and which receives coal from an overhead continuous coal bin. Through a rack and pinion valve, *D*, coal is fed into the hopper, *E*, the hopper being telescopic to enable the machine to descend or ascend. The lowering and raising of the projector is accomplished by very simple means, the lower portion being suspended by two chains from the winch, *P*, and can easily be brought to the different retort levels by means of chain wheel, *O*, the guide rods, *E*, keeping the machine steady. The entire machine is suspended from a simple channel iron carriage, *A*, which can be propelled along the overhead rails either by hand with chain wheel, *B*, or by an electric motor properly applied.

Method of Operation.—The De Brouwer coal projector takes the lead on the important point of simplicity of action in mechancal charging. The projector is first placed in position in front of the retorts to be charged. The valve, *Q*, of the coal bin is opened and measuring chamber, *C*, is filled, the exact amount of charge being regulated by an adjustable telltale. The electric motor, *K*, is started, and after the charging machine is up to the required speed, which is determined by the length and shape of the retorts, and the character of the coal, the machine is brought into action by opening valve *D*.

The principle of operation is as follows: The chief feature is the grooved wheel, *F*, Fig. 3, of which Fig. 4 is a section at *a—b*. It con-

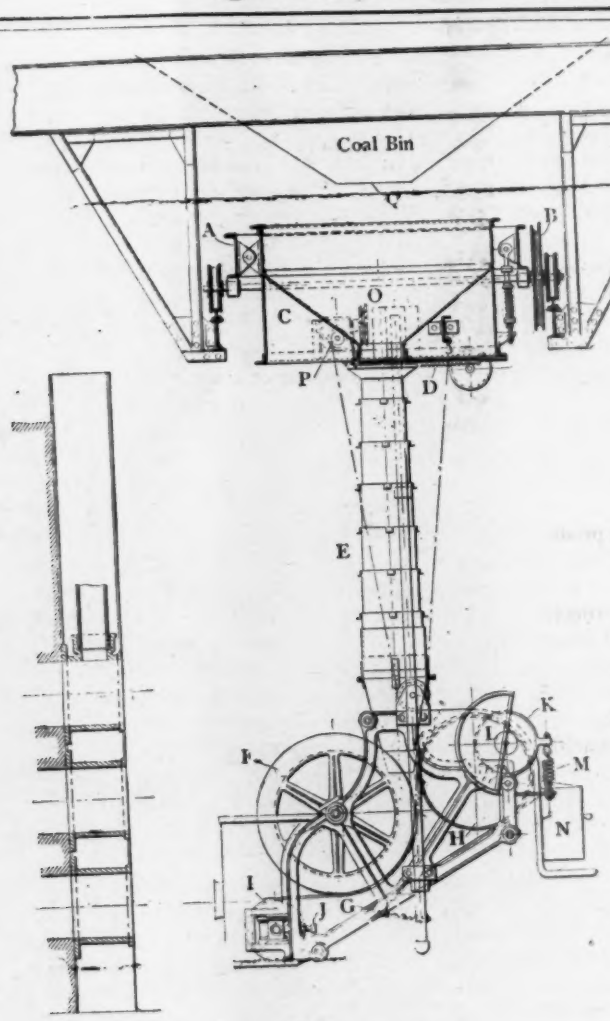


FIG. 1.

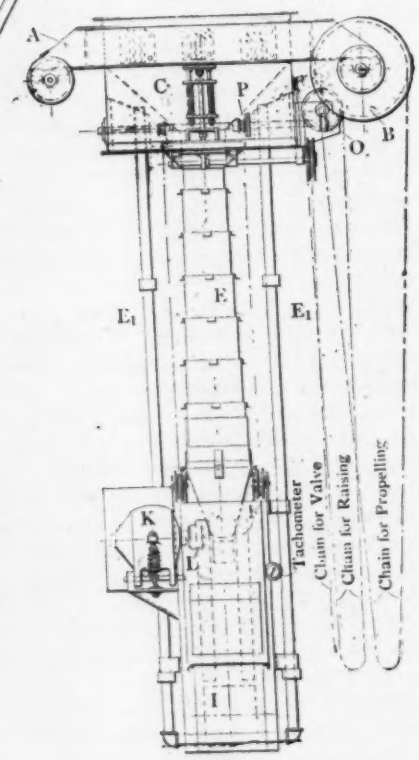


FIG. 2.

FIG. 4.

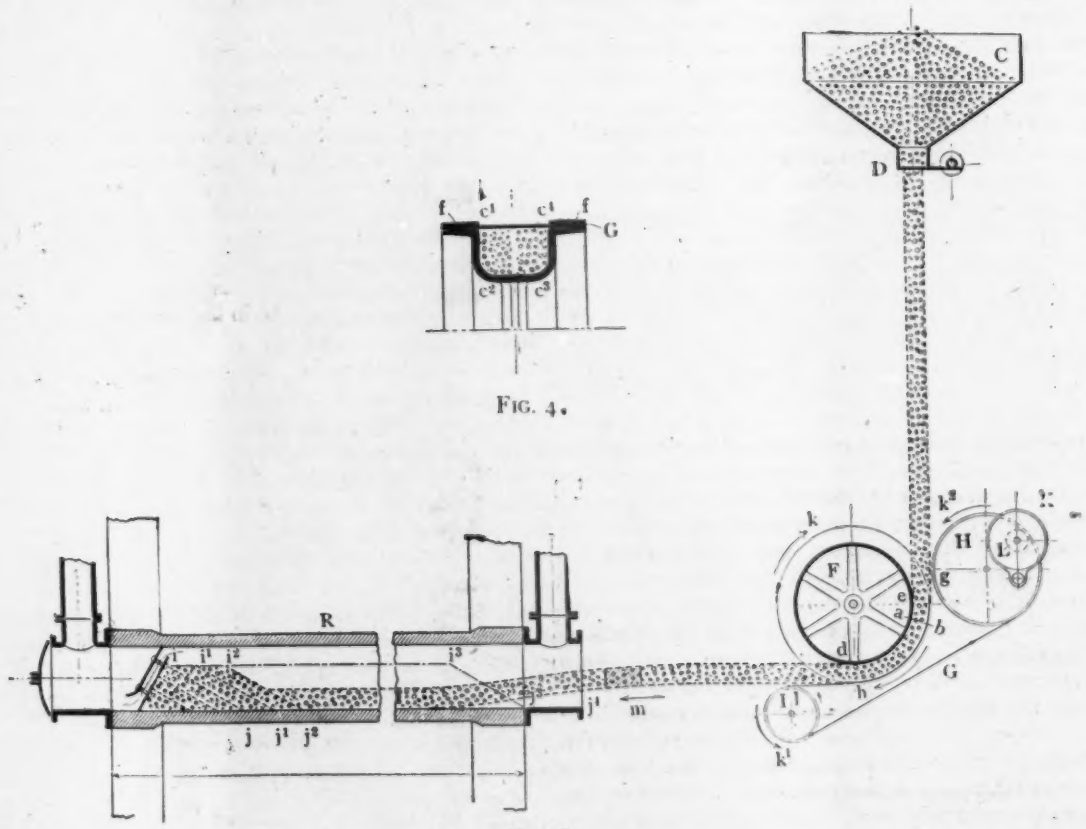


FIG. 3

consists of a rectangular groove, marked by the letters c^1, c^2, c^3, c^4, with the bottom slightly rounded. This groove is covered over one-fourth of the rim of the wheel, *d*, *e*, by an ordinary driving belt, *G*. The two tongues, *f*, sewn on the edge of the belt, are intended to strengthen the sides. Suppose the belt to be first passed over the driving wheel, *H*, and then over the guide pulley, *I*, there will have been formed at *g*, *h*, *d*, *e*, a channel of which the section is represented by the rectangle, c^1, c^2, c^3, c^4. If the wheel, *F*, is turned at a given speed in the direction of the arrow, *k* (the other wheels turning at k^1 and k^2), the channel becomes movable, and if coal is introduced into measuring chamber *C*, as shown,

the centrifugal force due to the speed of the wheel carries it to the point *l*, whence it is injected in the direction of the arrow, *m*, into the retort, *R*. Between *g* and *h* the coal becomes caked together. When the stream of coal reaches the end of the retort, it is deposited in oblique layers, as shown at i, i^1, i^2, j, j^1, j^2. If the stream happens to be stopped for a moment, the surface of the coal is always found to be oblique, as at i^3, j^3. In the event of a temporary suspension of the supply of coal from the measuring chamber, the shape of the stratification is not affected, nor is it altered if the coal is thrown in piece by piece in suceession. The wheel, *F*, does not act, in conjunction with the driving belt, as a breaker, or even as a compressor, but simply a producer of the centrifugal force which supports the coal upon the belt. When the charge is complete, the coal is found to lie at the angle, i^3, j^3, and the space between j^3 and j^4 is absolutely free from dust. Consequently, notbing more is required than the closing of the retort lid.

The machine can be adjusted to any weight of charge and to any length of retort. The power required is very small, a 5-horse power motor being all that is necessary for charging 20-foot retorts,

Construction.—The construction is simplicity in itself. To produce an apparatus for efficient and effective mechanical charging of retorts, with few parts, durable, light and compact, was the aim of the inventor. These conditions are fully met with in the De Brouwer projector. There are but few movable parts, and, therefore, a very small loss in friction. The durability of the apparatus cannot be overestimated The only part subject to any appreciable wear and tear is the leather belt, which, with proper care, should last for a considerable time.

A very commendable feature is that no part of the charging machine enters the retort, the closest part being about 4 feet from the mouthpiece.

The Calorific Valuation of Gas.

By H. Leicester Greville, in *Journal of Gas Lighting.*

In a recent article on the "Photometrical Valuation of Gas," alluding to the subject of calorimetry, I stated: "This much is at least certain—viz., that with coal gas and water gas, the calorific value decreases with the diminution of illuminating power." In using the term "water gas," I should have said carburetted water gas. It is perhaps a little premature to discuss the probability of calorimetry replacing photometry as a means of effecting a valuation of the public gas supply; but the subject is one on which a few remarks will be of interest.

It may be stated initially that prior to the development of the incandescent system of gas lighting, any question of a possible correspondence or ratio between heating and lighting values would have been considered foolish and impossible. Now the question has entirely changed. We have only to remember that the lighting function of gas, *quo ad* its use for illumination in ordinary burners, is totally destroyed, and a Bunsen effect by due admixture of air supply substituted, before the most efficient results on the incandescent system are obtained, in order to truly recognize the fact that the more modern system of illumination is a pure function of heat. This is broadly true; but the ratio between the illuminative effect of gases of different qualities burned on the older and the newer systems of illumination has yet to be determined. The discrepancy is, however, so greatly in favor of the incandescent system, that comment with respect to this aspect of the question seems almost superfluous.

The cheapest burners available for the production of light are of the batwing or fishtail type, all having the disadvantage of not affording light equally in all directions—even on the horizontal plane. A low c ass one of this type may possibly be bought for a penny, and a high class one for sixpence. Even the highest class of this type can scarcely claim to develop 3 candles per cubic foot of 16-candle gas; while with a fall in the illuminating power of the gas, the efficiency of this class of burner rapidly decreases. When we come to Argands, we have the advantage of an equal light in all directions on the horizontal, and a value of (say) 3.5 candles per cubic foot—a disadvantage, however, being the necessity for the employment of chimneys. They are an additional cost, and, unless they are kept scrupulously clean, they obstruct a large percentage of the light.

Now with regard to the incandescent system. For indoor illumination no chimney is required; the light on the horizontal plane is equal in all directions; the price of a burner complete with mantle is (of a cheap but efficient make) about 16 cents; and the light is at the very least from 16 to 20 candles per cubic foot of gas consumed. Mantles are cheap; and the cost for necessary renewals is in any reasonable case more than compensated for by the saving of gas consumption, leaving the immensely increased light as a distinct advantage. With higher class burners on the incandescent system, even more economical results may be obtained; any range from 20 to 40 candles per cubic foot of gas being insured. So that, both in regard to private and public lighting, there is a capacity for light development undreamed of in the past, and capable of further progress in the future.

The inevitable conclusion from the march of science is that the present system of the valuation of gas on the old lines of pure photometry, as a balance of protection between producers and consumers, is utterly inadequate. We have arrived at a period in which probably 50 per cent. of the total gas manufactured is used for heating and power purposes. This is a pure question of calorific value. With regard to lighting, it is only a matter of time and experience for the incandescent system of illumination to replace the older and cruder methods of light development. In this case, the question will also be mainly that of the calorific value of the gas.

The estimation of the calorific value of a gas can now be made with absolute accuracy. I have used the three best known forms of apparatus, with little difference in the results, on many different grades of gases. I allude to the Junkers, the Dowson, and the Simmance-Abady. My main experiences have been with the last appliance. I regard calorimetric instruments as being as accurate as photometrical appliances for their special purposes.

As I have already stated, little is known between the ratio of heat and light values as estimated by calorimetry and photometry. The following figures will appear, however, to throw some light on the subject. They are quoted from Mr. Dibdin's book on "Public Lighting by Gas and Electricity," and are the mean of my experiments and those of others on coal gas.

Lighting Value. Candles.	B.T.U. per Cubic Foot.	Lighting Value. Candles.	B.T.U. per Candle.
11.0	500	11 to 12	30
11.5	514		
12.0	530	12 " 13	30
12.5	545		
13.0	560	13 " 14	32
13.5	576		
14.0	592	14 " 15	31
14.5	607		
15.0	623	15 " 16	29
15.5	638		
16 0	652	16 " 17	30
16.5	667		
17.0	682	17 " 18	32
17.5	698		
18.0	714		

Of course, while the means for estimating the lighting values is not stated, the heat values are no doubt correct. The first two columns are from Mr. Dibdin's book; but the figures with regard to the ratio of illuminating value and heat units I have calculated. It will be seen that there appears to be in the case of coal gas a definite ratio between photometrical and calorific value. Quoting from the same publication, water gas is credited with a heat value of 435 B.T.U., while carburetted water gas is assigned a value of 470 B.T.U. Unfortunately, the lighting power is not stated; but 20-candle water gas possesses, to my own knowledge, a calorific value of about 620 B.T.U. There is no doubt that carburetted water gas conforms to an increase of light with increase in the illuminating power; but in the same ratio as coal gas. Water gas is, however, for obvious reasons, not likely to supplant coal gas for the public gas supply to act as an adjunct.

In offering the above remarks on the ratio between photometric and calorimetric value, I do not intend to seriously propose at the present time that calorimetry should replace photometry, but simply to show that the question is ripe for serious consideration as to what may be possible in the future.

Sir Oliver Lodge on Electricity.

Sir Oliver Lodge, F.R.S., in the current issue of *Harper's Magazine*, has an interesting popular article on the latest theories and speculations as to the nature of electricity. It may be quoted as the latest exposition of his views. He writes:

"Electricity is not a form of energy any more than water is a form of energy. Water may be a vehicle of energy when at a high level or in motion; so may electricity. Electricity cannot be manufactured, as heat can: it can only be moved from place to place, like water; and its energy must be in the form of motion or of strain. Electricity under

strain constitutes 'charge;' electricity in locomotion constitutes a current and magnetism; electricity in vibration constitutes light. What electricity itself is we do not know, but it may perhaps be a form or aspect of matter. So have taught for 30 years the disciples of Clerk-Maxwell. Now we can go one step farther and say matter is composed of electricity, and of nothing else—a thesis which I wish to explain and partially justify.

"First we must ask what is positive electricity, and the answer is still we do not know. For myself I do not even guess—beyond supposing it to be a mode of manifestation or a differentiated portion of the continuous and all-pervading ether. It seems to exist in lumps the size of the atoms of matter; and no portion of it less in bulk than an atom has ever been isolated, nor appears likely to be isolated.

"But concerning negative electricity we know a great deal more. This exists in excessively minute particles, sometimes called electrons and sometimes called corpuscles; these are thrown off the negatively charged terminal in a vacuum tube, and they fly with tremendous speed till they strike something. When they strike they can propel as well as heat the target, and they can likewise make it emit a phosphorescent glow, especially if it be made of glass or precious stones. If the target is a very massive metal like platinum, the sudden stoppage of the flying electrons which encounter it causes the production of the ethereal pulses, known as X-rays. Electrons are not very easy to stop, however, and a fair proportion of them can penetrate not only wood and paper, but sheets of such metals as aluminum and other moderately thin obstacles. That is because they are extremely small—much smaller than the atoms of matter.

"Each electron has a definite charge of electricity—viz., the same charge as is conveyed by each single atom when a current is passed through a chemically conducting liquid. Every electron has also a definite and uniform mass, which is about $\frac{1}{1000}$ of that of an atom of hydrogen—hitherto the lightest known form of matter.

"From every kind of material the same and no other kind of electron can be obtained, and we have reason for asserting that no other kind exists.

"Electric currents are always due to the locomotion of these little electric charges; they permeate and make their way through metals, being handed on from one atom to the next, as a fire bucket is passed from hand to hand. This is metallic conduction. Liquid conduction is different; the electrons travel with the atoms in liquids, and hence travel slowly, being jostled by the crowd, and being laden with the heavy atom which they convey or propel, as a pony (or a flea—in mass a pony, but in bulk a flea) might drag a heavy wagon through crowded streets, until at the terminal station it is unharnessed and allowed to trot into its stable, which is what happens when the boundary between liquid and metalic conductors is reached. Electrons become still more emancipated, however, in rarefied gases, which act as a cleared racecourse, or like a free range for flight; and then it is possible to find them flying at prodigious speed, even as high as 100,000 miles a second, and sometimes faster still, but never quite so fast as light.

"Whenever an electron is suddenly started or stopped or made to turn a corner it disturbs the ether through which it had been quietly moving and excites a ripple in it. These ethereal ripples constitute radiation, and the best known variety of them we call 'light.' With this we have been familiar for a long time, because of our happening to possess eyes—instruments for the ready appreciation of ethereal ripples. We used not to know the reason, however, for the production of light. We know now that it is due to the sudden change of motion, either in speed or direction, of an electron, and probably to no other cause.

"The charge in an electron is very small, but is extremely concentrated—that is to say, it exists only as a very minute nucleus; and in order to explain the manifestation of the observed mass of $\frac{1}{1000}$ part of a hydrogen atom by so trifling a quantity of electricity it is necessary to suppose that it is concentrated into a space one-hundred-thousandth of the diameter of a material atom. This is the size which is at present accepted for an electron. It is quite the smallest thing known.

"Matter, then, appears to be composed of positive and negative electricity, and nothing else. All its newly discovered as well as all its long known properties, can thus be explained—even the long standing puzzle of 'cohesion' shows signs of giving way. The only outstanding still intractable physical property is 'gravitation,' and no satisfactory theory of the nature of gravitation has been so far forthcoming. I doubt, however, if it is far away. It would seem to be a slight but quite uniform secondary or residual effect due to the immersion of a negative electron in a positive atmosphere."

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

AT the annual meeting of the Equitable Gas Light Company, held in Philadelphia last Monday, no change was made in the executive management.

MR. WILLIAM A. BULLARD has been chosen President of the Cambridge (Mass.) Gas Light Company vice the late Mr. Q. A. Vinal.

ON the 16th inst. Messrs. J. Hector McNeal, J. J. De Kinder, M. W. Willets, F. W. Eyre and H. E. Woodman will apply to the State authorities for a charter for a gas works to be known as the Newtown (Pa.) Gas Company.

THE following is the opinion of Mr. George L. Record, Corporation Council for Jersey City, respecting the request of the Board of Aldermen as to their authority to cause regular inspection of the gas and electric meters in use in that city: "To the Honorable the Board of Aldermen of Jersey City: Gentlemen—In reply to your resolution as to the jurisdiction of your Board in the matter of the inspection of gas and electric meters, I have to say that by Section 24 of the Act of March 31, 1871, the Board of Aldermen is authorized to pass, alter or repeal ordinances for sundry purposes, among which is the following: 'To provide for the appointment and government of inspectors of scales, weights and measures, and to prescribe their duties and compensation, and to enforce the keeping and using of just weights and measures.' By virtue of this statute the Board of Aldermen passed an ordinance on June 6, 1871, defining the powers and duties and regulating the compensation of inspectors of scales, weights and measures. A supplement to this ordinance has since been passed. These ordinances contained no reference to meters of any kind. I am of the opinion that, by virtue of the foregoing law, your Board has the power to pass an ordinance, similar to the ones above referred to, enlarging the powers, duties and compensation of the existing Inspector of Weights and Measures, so as to vest in him similar control over gas and electric meters as he now has, by virtue of said ordinances, over the subject matter of the same."

AT the annual meeting of the South Hadley (Mass.) Gas Company the officers chosen were: Directors, C. A. Gridley, A. L. Wright, W. E. Preston, W. E. Burnett and M. L. Welcher; President, C. A. Gridley; Treasurer, A. L. Wright.

THE city attorney of Milwaukee, Wis., has given an opinion declaring that the Milwaukee Gas Light Company has a right to purchase gas from the Semet-Solvay Company, and that it also has the right to lay mains to convey the gas from the Semet-Solvay to its own plant.

THE semi-annual dividend (2½ per cent.) of the Portland (Me.) Gas Light Company was paid the 1st inst.

AT a special meeting of the Directors in the New Britain (Conn.) Gas Light Company, held the last week in July, it was voted to put the net selling rate at $1.25 per 1,000 cubic feet. The concession is to date from October 1st. One queer thing in connection with this reduction is the statement made by the Company that the day for the new rate was put so far ahead because of the "great amount of labor involved in the changing over of the prepayment meters."

THE owners of the Ridgewood (N. J.) Gas Company have petitioned the Village Trustees for permission to increase the selling rate on gas sold for fuel purposes to $1 per 1,000. Under its franchise the Company may charge not to exceed 85 cents. There can be no question, considering its location and inhabitants, that dollar gas in Ridgewood would be very, very reasonable, and that any lower rate is most unfair.

MR. AND MRS. F. C. SHERMAN, of New Haven, Conn., are making a visit to Europe. They sailed, per Aurania, July 25th, and expect to return late in September.

A CORRESPONDENT in Des Moines, Ia., writing under date of the 30th ult., says: "The franchise tax of the Capital City Gas Light Company, of this city, for the past six months, which was paid in the form of a warrant in favor of City Treasurer Gross yesterday, is the largest that has been paid to the city since the Company's amended franchise was granted. The draft accepted by the city calls for the payment of $3,337.57, or 2 per cent. of the gross receipts for gas sold during the 6

months ending July 1. Not only is the face of the draft much larger than that of the preceding 6 months, but it is in excess of all previous similar payments, indicating the constant growth in the volume of business of the Company. For the 6 months previous, the franchise tax was $2,862.09. For the entire year of 1903 the tax amounted to $5,442. The franchise tax of the Edison Electric Light Company, for the 6 months ending July 1, was also paid yesterday. The face of the draft is $1,102.82, also much in excess of that of the previous 6 months. For the 6 months previous the tax was $949.91. The Edison Company, however, is only required to pay a tax of 1 per cent. of its gross receipts. These are the only two franchises from which the city derives any revenue."

AT the annual meeting of the Fitchburg (Mass.) Gas and Electric Light Company the following officers were chosen: Directors, H. I. Wallace, Charles I. Crocker, Henry V. Page, Frank F. Shepley, George E. Clifford, Chas. E. Ware and George R. Wallace; President, H. I. Wallace; Clerk, Treasurer and General Manager, Henry F. Coggshall.

T. W. STANTON is informed that the interest on the first mortgage bonds of the Williamsport (Pa.) Gas Company is payable either at the office of the Fidelity Trust Company, Philadelphia, Pa., or at the office of Messrs. T. W. Stephens & Co., No. 2 Wall street, New York.

THE proprietors of the Kewanee (Ills.) Light and Power Company have authorized the expenditure of several thousand dollars on main extensions.

AT the annual meeting of the Fall River (Mass.) Gas Works Company the officers chosen were: Directors, E. S. Webster, G. C. Lee, Russell Bobb, Chas. F. Prichard, Philip Dexter, Philip Stockton and A. D. Foster; Treasurer, A. S. Pratt; Clerk, Henry R. Hayes; Asst. Treasurer, George P. Brown; Manager, Joseph E. Nute.

A CORRESPONDENT in Milwaukee, Wis., forwards the following: "Students of sociology and reformers have often advocated that men should be instructed in cooking and several attempts have been made to inculcate into the masculine mind the intricacies of the frying pan and the tea pot. But it has remained for a modern, up-to-date corporation, presumably with no intention of blessing the world by its purely philanthropic endeavors, to actually start a cooking school for men. Some nights ago there was a class of 16 young men who spent several hours over the blazing fire—no, over the blue flames of the gas stoves—baking biscuits, broiling steaks, roasting veal, frying, boiling, poaching and scrambling eggs and otherwise disporting in the realm usually reserved for the fair sex. It was in the basement of the offices of the Milwaukee Gas Light Company and the students were the solicitors who call upon the housewives of the city and try to induce them to buy gas stoves. In order to make them perfectly familiar with the benefits to be derived from the gas stoves, F. J. Rutledge, the Superintendent of New Business, conceived the idea of putting the solicitors through a course of training. Miss Olive Blanchard was engaged as demonstrator and began the work of instructing the men how to boil water without burning it, how to tie up a roast of beef so that the juice wouldn't leak out into the oven, how to broil a steak so that it will melt in one's mouth, how to bake a chocolate cake so that it wouldn't fall, and all the other tricks of the baker's trade. All this, of course, was to be to show how easy these things can be done on a gas stove. Incidentally, it is supposed, the young men were to keep the oven at an even temperature and how to manipulate the flames so that the toast would not be turned to a blackened crisp instead of a tempting brown. Mr. T. A. Donavan, who recently came to Milwaukee from Denver, took the prize for biscuits, turning out a batch of them that were admitted by the demonstratress to be as good as mother ever dared to try to make. It was said by the officials of the Company that not a particle of food was spoiled in the first lesson, although it is admitted that several of the men burned their fingers, and one of them lost his temper and said 'Damn' when the cooking didn't go to suit him. As a punishment for not doing well, the cooks were made to eat the results of their cooking, and those who couldn't get the knack of doing it just right were chagrined when they were compelled to partake of the mess, while others were eating the fine, savory stuff which they had concocted. These cooking school sessions will be held regularly in the exhibit room of the Gas Company and the housewives of the city may in time be enabled to learn a thing or two about cooking from the solicitors who try to sell them gas stoves."

THE property of the Oxy-Hydrogen Gas Company, of Wilmington, Del., was sold at sheriff's sale, July 26th. It was bought by William S. Hilles, attorney, for $2,500. It was not stated who Mr. Hilles represented. The plant was erected by the Oxy-Hydrogen Company, of which J. Edward Addicks was the moving spirit, but never made gas because the city would not grant the Company permission to lay pipes in the city. The fact that Mr. Hilles is counsel for the Wilmington Gas and Electric Company gave rise to the rumor that the plant might have been purchased by that Company.

WRITE to the Jeffrey Manufacturing Company, Columbus, O., for a copy of its folder on water elevators.

THE Poudre Valley Gas Company, to build and operate a gas plant in Fort Collins, Col., has been incorporated by Messrs. H. F. Hattell, J. B. Arthur, Frank English, C. H. Shelton and F. P. Stover. The concern is capitalized in $75,000.

ARRANGEMENTS have been made for the taking of the affairs of the Denver (Col.) Gas and Electric Company out of the custody of a receiver.

THE General Council of Louisville, Ky., has re-elected Messrs. T. Hunt Stucky, W. J. Abram, George Gaulbert and W. H. Edinger as the city's representatives on the Board of Directors of the Louisville (Ky.) Gas Company.

THE Illinois Illuminating Company has succeeded to the properties and franchise rights of the East St. Louis (Ills.) Gas Company. The new concern has the right to furnish gas and electric currents for lighting, heating and power purposes in St. Clair and Madison counties, Ills.

IT is likely that the Indianapolis Gas Company will agree to supply gas on fuel account for 70 cents per 1,000.

Electric Lighting and Criminality.

Electricity says that it is strange that in the annals of crime a point is reached where science begins to play an all-important part—to act as a powerful deterrent, to be the influence in stemming the flood of moral obliquity that threatens the integrity of city and town.

Electricity does not complete its function in supplying light to the home; perhaps it serves a greater purposed in supplying light outside the home. The conditions existing in a great metropolis like New York are so varied and complex that at night, while millions are at rest, the sneak thief, the burglar, the thug and other night birds could work undisturbed in many quarters were it not for the electric light.

Police Commissioner McAdoo, of New York, has hit the nail on the head when he remarks:

"I have always believed that light would prevent a great deal of disorderly conduct at night in certain streets. I do not believe there is anything that would rid us of illegal resorts and clean up certain streets as would light. If they were to give me the charge of lighting New York as well as protecting New York I would at least double the light.

"I know of a place here before which a big light was put. The proprietors practically got down on their knees to have it removed. I would apply the light remedy."

And the light remedy cannot be equaled for efficiency and cheapness. What would the police force of New York number if inferior illumination were employed in the city streets? A conservative estimate would at least double them to secure comparative safety for the public. The great central stations with their immense investments in machinery, real estate and copper perform a service whose widespread advantages are doubly appreciated by the belated traveler and the late home-comer. What value could be placed upon the lives, limbs and money saved by the brilliant lighting of the city streets had best be left to such men as Commissioner McAdoo, or some other expert in the handling of criminal classes. The municipality had better take the cue, less light, more crime, more light, less crime. There are still dark spots to be found at night within the city limits, where a few powerful arcs would wield an immediate influence. It is easy to see that arc lights are cheaper than police officers, and a brightly lit city the greatest imaginable offset to criminality in any stage or form.

It would be only just to state that the inclosed arc has played a very important part in this connection. The older types of lamps could be blown out and their mechanism was frequently defective. The lamps of the inclosed type defy the weather, and can be relied upon to automatically light up without fear of failure.

The city is well protected by the arc, better in fact than ever before, considering the millions depending upon the vigilance of the police and these street lights.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
EDITORS.

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NOTIFICATION RESPECTING ADVERTISING.

Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:
New York—American News Co., 39 and 41 Chambers St.
Germany—Lemcke & Buechner, of New York.
England—Aug. Siegle, 30 Lime Street, London.

MONDAY, AUGUST 8, 1904.

The Market for Gas Securities.

There was, contrary to the general belief, quite some trading in Consolidated last week, and the net result of the dealings was a gain of three points—the closing to-day (Friday) coming in at 195¾ to 196¾. The present standing before the courts of the Company's appeal for certain rights "under the river" is given as the reason for the advance by many of the wiseacres, but in any event the stock is worth very much more than the price at which it is selling. The action of the Supreme Court, in the matter of the readjustment of the appraisement of the property of the Edison Electric Illuminating Company should be carefully studied by shareholders of the Consolidated Company.

Brooklyn Union is at the figures of last week, but nothing was done in it of a trading nature. Buy it while there is still time to get it anything under 225. Peoples, of Chicago, closed at 101¾ to 101½, and Consolidated, of Baltimore, is offered at 77. Gas bonds continue in good demand.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

AUGUST 8.

☞All communications will receive particular attention.

☞The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	195¾	194¾
Central Union, Bonds, 5's	3,000,000	1,000	108⅛	108⅛
Equitable Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,300,000	1,000	118	120
Metropolitan	658,000	..	108	112
Mutual	3,500,000	100	270	300
Municipal Bonds	750,000	..	..	..
New Amsterdam Gas Co..				
Bonds, 5's	11,000,000	1,000	107⅛	109
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	35	..
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	..	..	..
Northern Union, Bonds, 5's	1,250,000	1,000	102½	105½
New York and East River..				
Bonds 1st 5's	3,500,000	1,000	111	113
" 1st Con. 5's	1,500,000	..	106	108
Standard	5,000,000	100	125	13
Preferred	5,000,000	100	145	155
Bonds, 1st Mortgage, 5's	1,500,000	1,000	116	117
Yonkers	299,650	500	130	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	213	220
" " Bonds (5's)	15 000,000	1,000	113	115
Bay State	50,000,000	50	⅛	3/16
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	28	30
" 1st Mtg. 5's	509,000	1,000	93	96
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	3¾	4
" " Bonds, 5's	5,250,000	1,000	72¾	.
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Cincinnati Gas and Electric Co	29,500,000	100	99¾	100
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	101	101½
Columbus (O.) Gas Lt. & Heating Co	1,682,780	100	88¼	89½
Preferred	3,026,500	100	107½	109
Consumers, Toronto	2 000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	76	77
Mortgage, 6's	3,600,000	..	..	118
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N.J.	1,000,000	100	15	17
" Con. Mtg. 5's	880,000	1,000	86	90
Consolidated G. & E. Co.'s.				
Little Falls, N.Y.	90,000	100	..	100
Bonds	75,000	..	..	100
Detroit City Gas Co	4,825,500	50	..	50
" Prior Lien 5's	5,603,000	1,000	99½	100
Detroit Gas Co., 5's	351,000	1,000	75	75½
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	39	40
Fort Wayne	2,000,000	..	..	..
" Bonds	2,000,000	..	55	..
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	..	67	68
" Bonds, 5's	10,500,000	..	103½	104½
Indianapolis	2,000,000	..	60	70
" Bonds, 6's	2,650,000	..	103½	106½
Jackson Gas Co	250,000	50	73	75
" 1st Mtg. 5's	290,000	1,000	101	102½
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	..	..
Preferred	2,500,000	100	75	100
Bonds	10,000,000	1,000	109½	110
Lafayette Gas Co., Ind.	1,000,000	100	..	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	135	140
Madison Gas & Elec. Co.				
" 1st Mtg. 5's	350,000	1,000	107½	108¼
" 6 per cent. scrip, due 1910	100,000	25	85	87
Montreal, Canada	2,000,000	100	218	218¾
Nashville Gas Lt. Co.	1,000,000	100	110	..
Newark, N. J., Con. Gas Co.	6,000,000	..	56	58
Bonds, 6's	4,600,000	..	105	105½
New Haven	1,000,000	25	64	70
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	01⅜	101½
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	.
Rochester Gas & Elec. Co.	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	15,800,000	100	58½	58¾
St. Joseph Gas Co.				
" 1st Mtg. 5's	751,000	1,000	92	94½
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgage 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	113½	115
General Mortgage, 5's	2,465,000	1,000	92	93
Syracuse, N. Y.	1,975,000	100	46	48
Bonds	2,047,000	1,000	94	96
Washington, D. C	2,600,000	20	287½	290
First mortgage 6's	600,000	..	..	..
Western, Milwaukee	4,000,000	..	..	..
Wilmington, Del.	600.000	50	230	..

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WANTED,

A Position with Gas Company

Desiring a competent prover, gasser and repairer of meters. Best of references.

Address, JOHN HEINING,
1521-2 ROYERSFORD, PA.

WANTED,

Four Expert Canvassers For Natural Gas Business.

No appliances sold. Salaries high, to right men. State experience, give references, and state salary expected.

Address, CHEMUNG COUNTY GAS COMPANY,
1522-1 Elmira, N. Y.

WANTED,

Experienced Gas Engineer,

Thoroughly familiar with the erection and operation of coal gas benches. Prefer one having a technical education and capable of making intelligent and comprehensive analyses of gases. Give full details concerning age, education. experience, salary expected and references, which will not be used without permission.

1522-2 Address, G. B. BUILDER, care this Journal.

FOR SALE.

Three Davis & Farnum Purifiers,

Twelve feet by 24 feet by 4 feet. Also,

One 50-Horse Power Bigelow Boiler

All in good condition. Address,

PAWTUCKET GAS COMPANY,
1522-4 PAWTUCKET, R. I.

WANTED,

Five-foot Meter Prover and a Five-Light, Water-Test Meter.

Must be in first-class condition. Address, "C. M. W.,"
1522-1 Care this Journal.

WANTED, AN EXHAUSTER.

A Second-Hand Roots Steam-Jet Exhauster,

Eight-inch connections, complete and in good order. Address, MARGARET PIERCE,
1520-tf Secretary, Springfield, Ills.

FOR SALE.

Lot of second-hand

THREE-LIGHT METERS,

in splendid condition; as good as new. Also one

NINE-FOOT STATION METER,

with a capacity of 1,000,000 cubic feet per 24 hours. Address, "VINDEX,"
1508-tf Care this Journal

FOR SALE.

One Section Wrought Iron Hydraulic Main, with Stiness tar take-off, for 3 benches of 6's.
One Section Main, for 4 benches of 6's.
Standpipes, Bridgepipes, Mouthpieces with Self-sealing Lids, for 7 benches of 6's.
One Sinuous Friction Condenser.
One Walker Tar Extractor.
Four Purifiers, 10 by 16 by 3; complete. Connections above apparatus, 10-inch.
One 50 Horizontal Return Tubular Boiler.

All of the above apparatus is in good condition, and to be sold, as the Company has been obliged to purchase larger for its new works. Address, TAUNTON GAS LIGHT CO.,
1522-6 Taunton, Mass.

FOR SALE.

Four Purifiers, 24 feet by 21 feet by 3 feet 1 inch; 18-inch cup; 20-inch centerseal.
Two Floor Carriages, vertical screws; boxes arranged for 3 layers of trays. Boxes originally set in square, 22 feet Supporting columns and I-beams also on hand.
Four Purifiers, 30 feet by 21 feet by 3 feet 1 inch; 18-inch cup; 20-inch centerseal.
Two Floor Carriages, one with hydraulic lift, one with vertical screw. Supporting columns and I-beams also on hand.
Two Cast Iron Condensers, 22 feet 2 inches long by 3 feet 6 inches wide by 16 feet high; 20-inch connections with by-pass, Cast iron tubes.
One Cast Iron Scrubber, 20 feet 3 inches long by 5 feet wide by 16 feet high.
One No. 14 McKenzie Exhauster, with by-pass; 20-inch connections.
One Station Meter, 14 feet by 14 feet 3 inches; 20-inch connections and by-pass.
One Station Meter, 14 feet by 11 feet 3 inches; 24-inch connections and by pass.
One No. 8 Sturtevant Blower.
One No. 8 McKenzie Exhauster.
Two No. 10 Sturtevant Blowers, cast iron case, steel blades.
Two McKenzie Blowers, same capacity as No. 10 Sturtevant.
One No. 7 Sturtevant Blower.
One Hydraulic Elevator, piston type, 4 feet by 6 feet platform; 15 feet lift.
One Hydraulic Elevator, 8 feet 6 inches by 4 feet 2 inches platform; 19 feet lift.

Above material in New York city and must be disposed of immediately. Communicate with the NEW AMSTERDAM GAS CO.,
1502-3 131-133 E. 23D ST., NEW YORK CITY.

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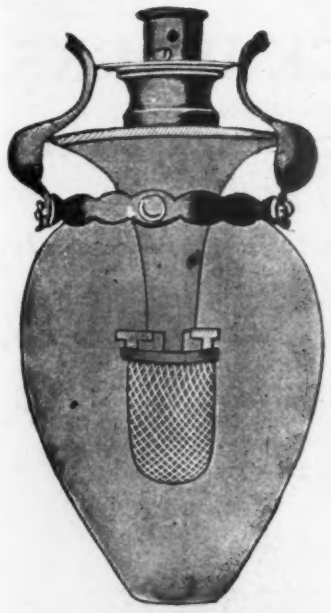

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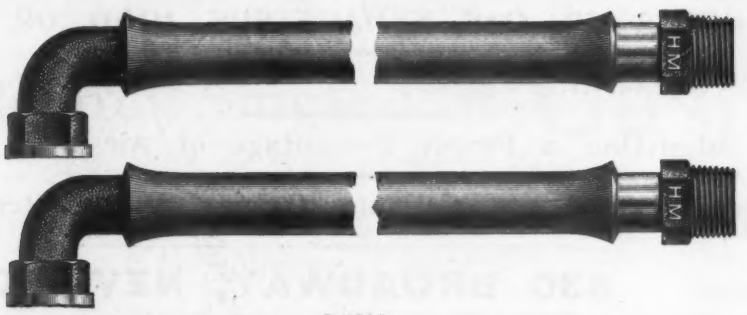

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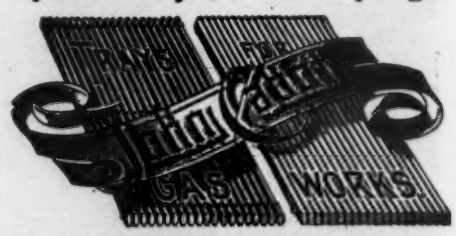

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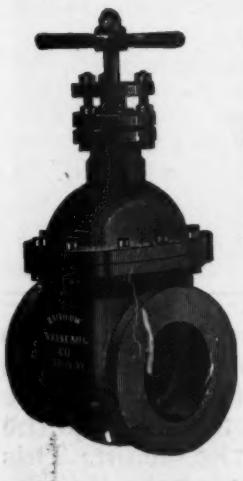

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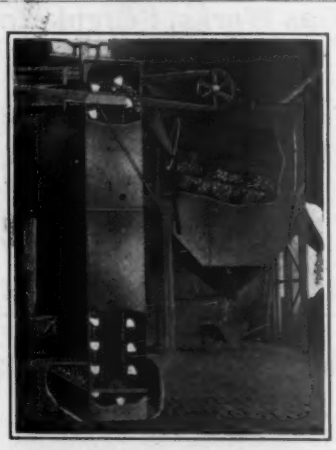

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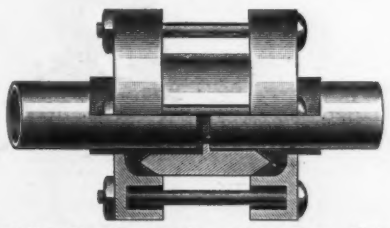

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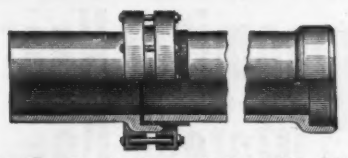

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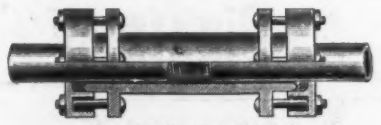

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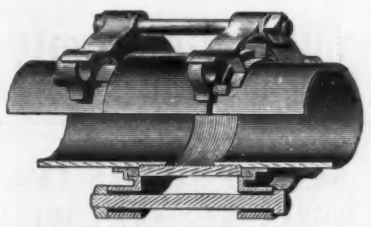

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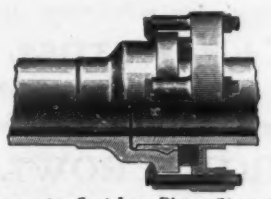

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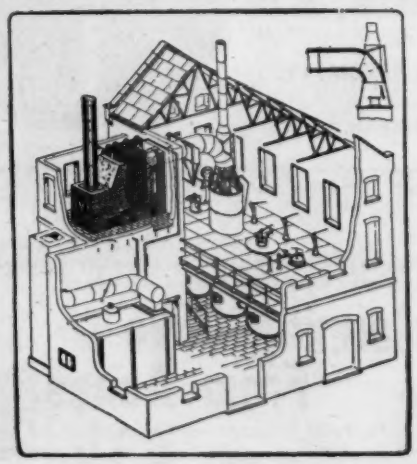

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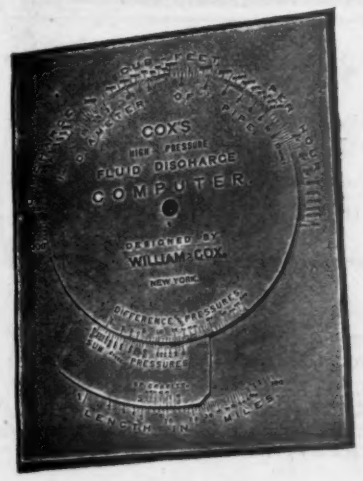

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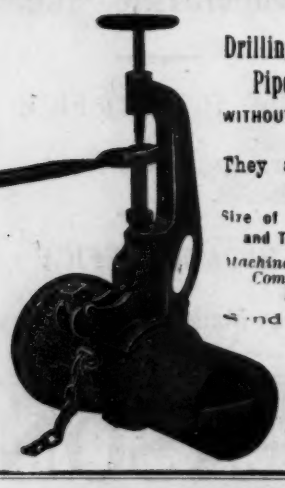

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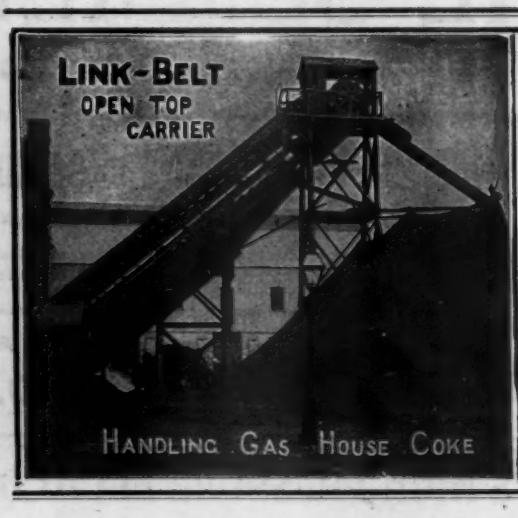

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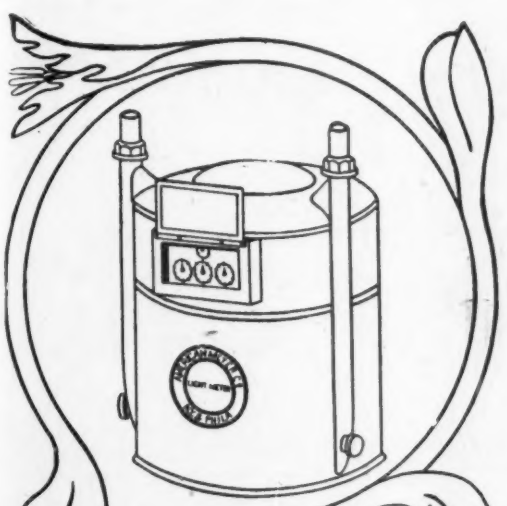
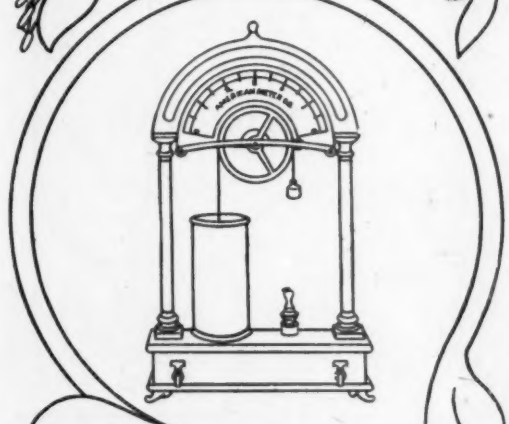
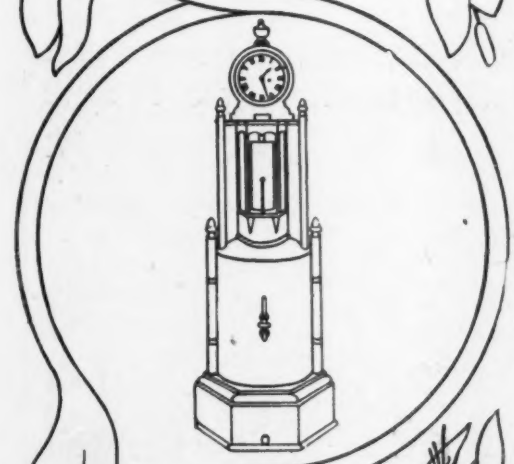
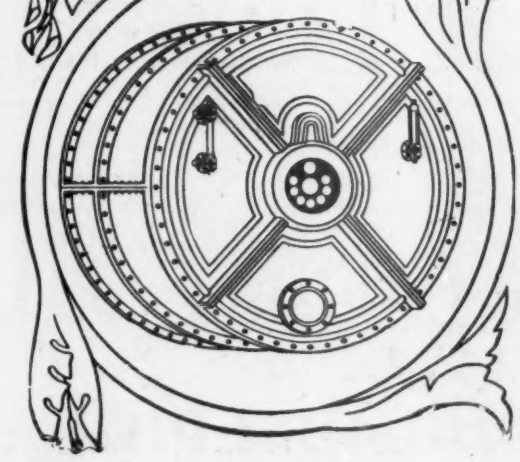








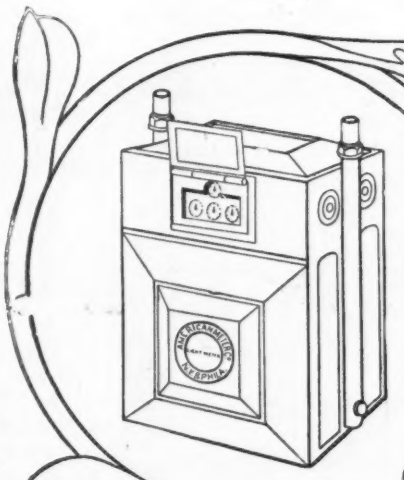
PUBLIC LIGHTING TABLE.

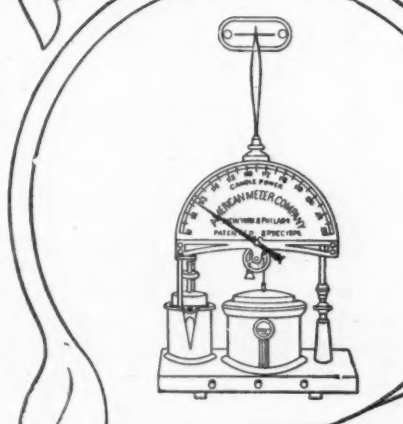
AUGUST, 1904.

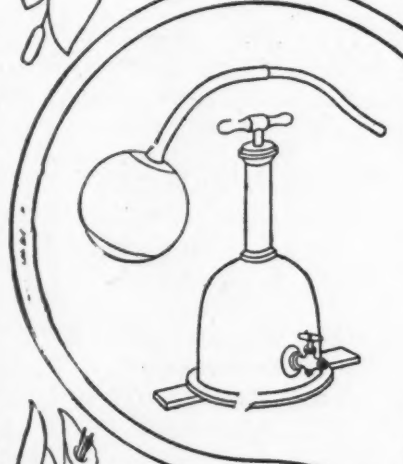
Day of Week.	Table No. 1. FOLLOWING THE MOON. Date.	Light.	Extinguish.	Table No. 2. NEW YORK CITY. All Night Lighting. Light.	Extinguish.
				P.M.	A.M.
Mon.	1	7.40 PM	11.00 PM	7.10	3.30
Tue.	2	7.40	11.30	7.10	3.30
Wed.	3	7.40	12.00	7.10	3.30
Thu.	4	7.40 LQ	12.30 AM	7.10	3.30
Fri.	5	7.40	1.10	7.10	3.30
Sat.	6	7.40	2.00	7.10	3.45
Sun.	7	7.30	2.50	7.10	3.45
Mon.	8	7.30	4.10	7.10	3.45
Tue.	9	7.30	4.10	7.10	3.45
Wed.	10	7.30	4.10	7.10	3.45
Thu.	11	7.30 NM	4.10	7.10	3.45
Fri.	12	7.30	4.10	7.10	3.45
Sat.	13	7.30	4.10	6.55	4.00
Sun	14	7.30	4.10	6.55	4.00
Mon.	15	7.30	4.10	6.55	4.00
Tue.	16	9.20	4.10	6.55	4.00
Wed.	17	10.00 FQ	4.10	6.55	4.00
Thu.	18	10.40	4.10	6.55	4.00
Fri.	19	11.30	4.10	6.55	4.00
Sat.	20	12.20 AM	4.10	6.45	4.10
Sun.	21	1.10	4.20	6.45	4.10
Mon.	22	2.00	4.20	6.45	4.10
Tue.	23	3.00	4.20	6.45	4.10
Wed.	24	No L.	No L.	6.45	4.10
Thu.	25	No L. FM	No L.	6.45	4.10
Fri.	26	No L.	No L.	6.45	4.10
Sat.	27	7.10 PM	8.30 PM	6.30	4.20
Sun.	28	7.00	9.00	6.30	4.20
Mon.	29	7.00	9.30	6.30	4.20
Tue.	30	7.00	10.00	6.30	4.20
Wed.	31	7.00	10.30	6.30	4.20

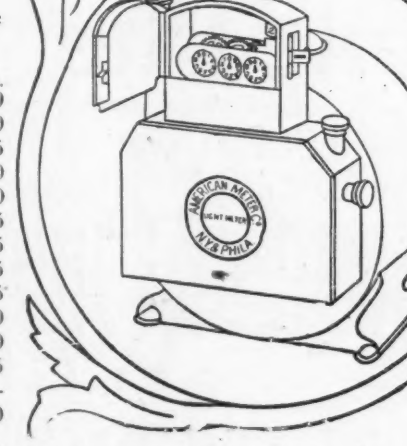
TOTAL HOURS LIGHTING DURING 1904.

By Table No. 1.	Hrs. Min.	By Table No. 2.	Hrs. Min.
January	225.00	January	423.20
February	205.40	February	367.40
March	187.40	March	355.35
April	169.50	April	298.50
May	152.30	May	264.50
June	137.20	June	234.25
July	138.50	July	243.45
August	151.00	August	280.25
September	164.40	September	321.15
October	191.30	October	374.30
November	210.30	November	401.40
December	237.10	December	433.45
Total, yr.	2171.40	Total, yr.	4000.00









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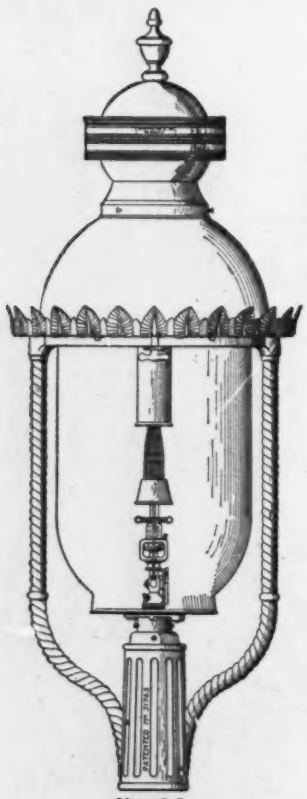

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Hagerstown, Md.	Duluth, Minn.	Tuckerton, N. J.
Malden, Mass.	New York (Mutual Co.)	Springfield, O.
Bridgeport, Conn.	Waltham, Mass.	Easton, Pa. (2d contract).
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Brooklyn, N. Y.	York, Pa.	Conshohocken, Pa.
Kansas City, Kas.	Minneapolis, Minn.	Mason City, Ia.
Hempstead, N. Y.	Allentown, Pa.	

TOTAL SETS FOR 1903, ... 62
TOTAL DAILY CAPACITY, ... 62,950,000 cubic feet.
TOTAL SETS TO DATE, ... 508
TOTAL DAILY CAPACITY, ... 362,780,000 cubic feet.

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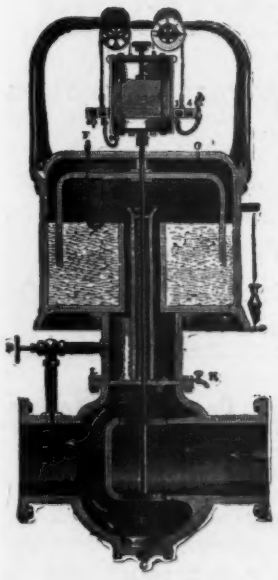

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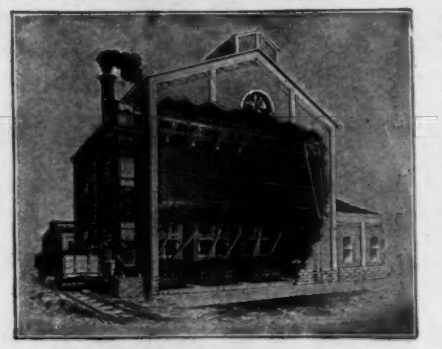

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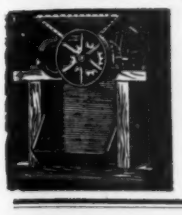

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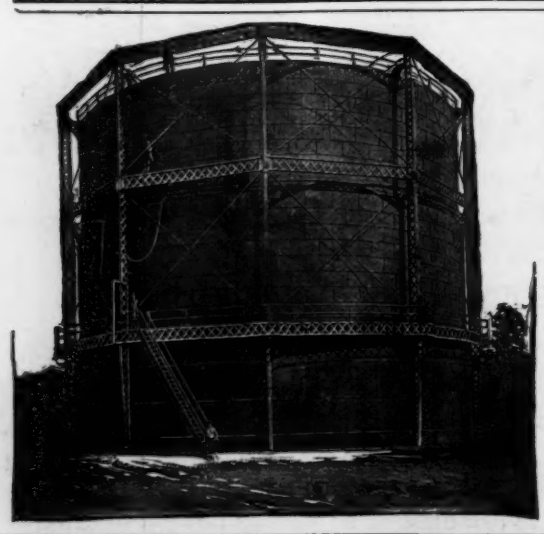

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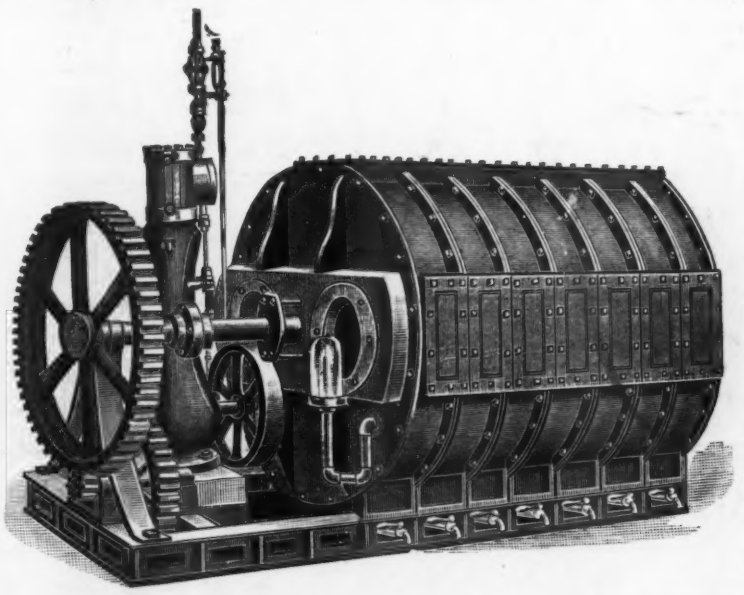

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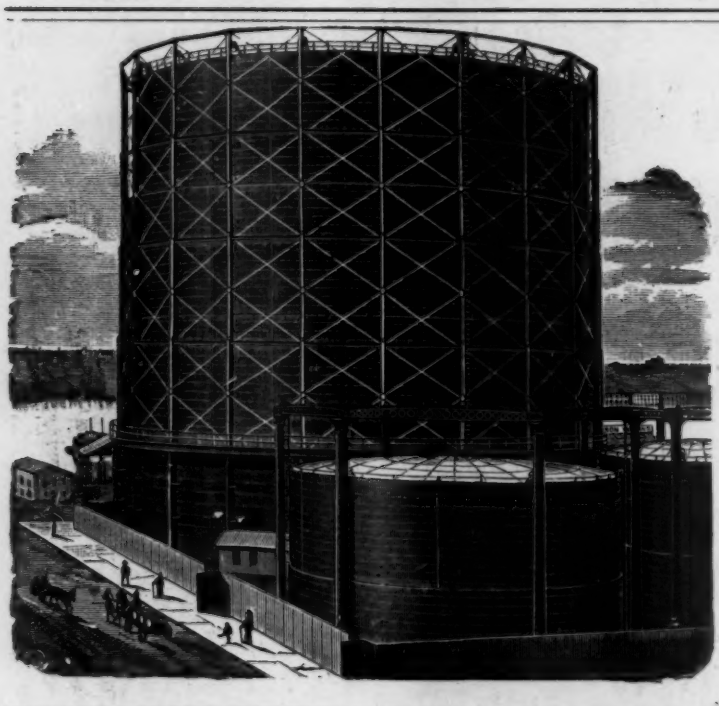

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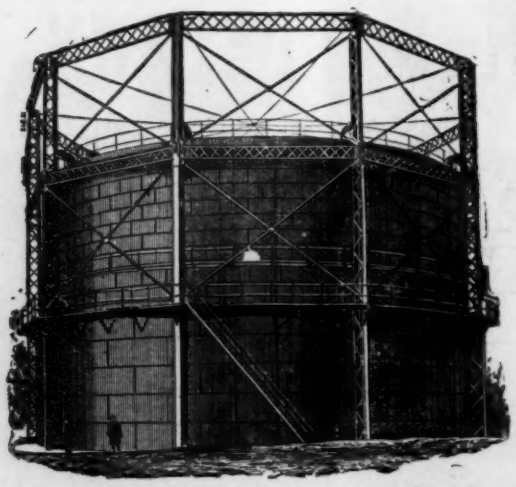

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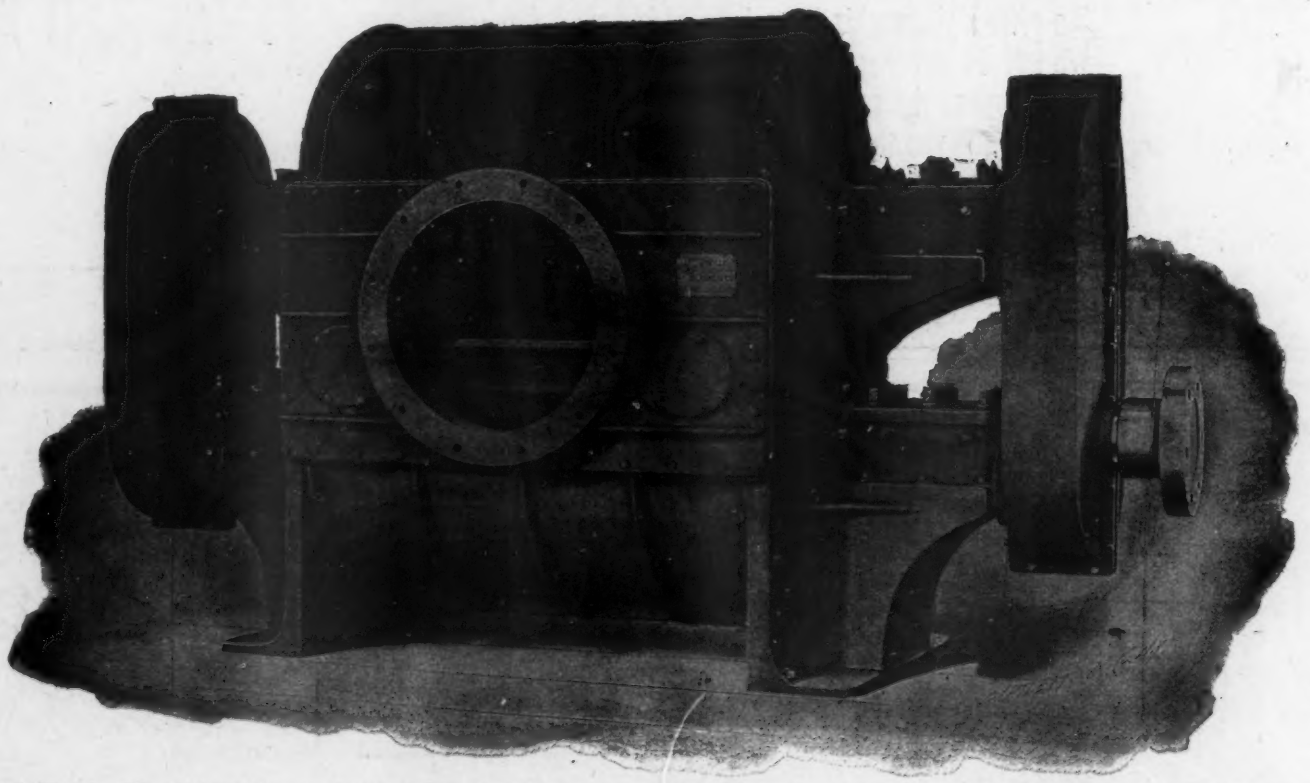

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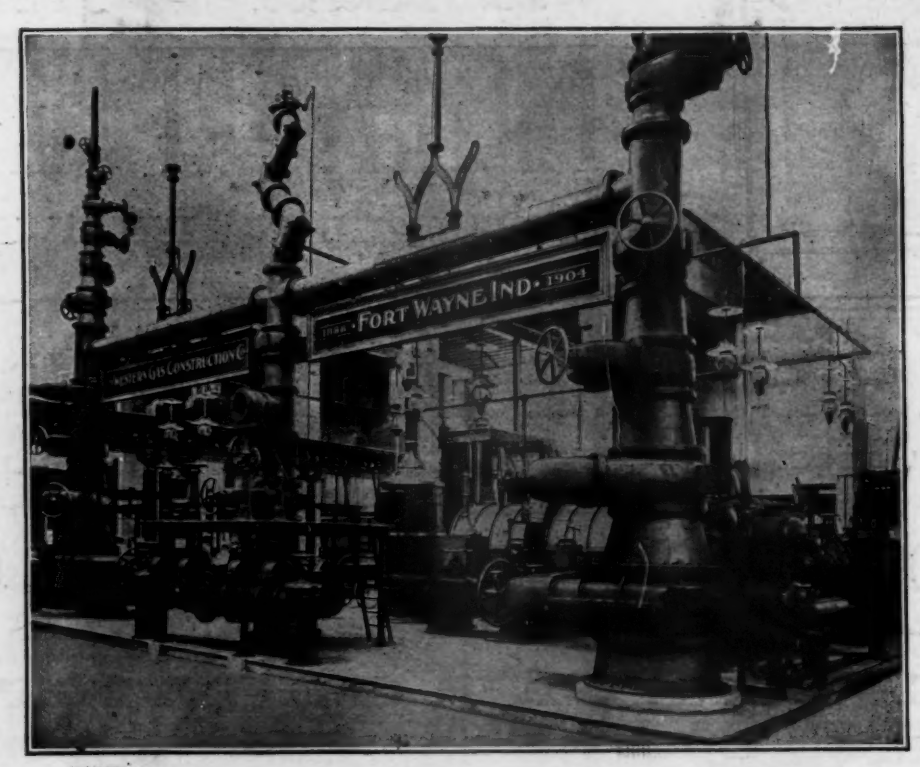

Section 15A.

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